UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2024

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15 (D) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from _____to_____

Commission file number: **001-40766**

Lightwave Logic, Inc.

(Exact name of registrant as specified in its charter)

Nevada	**82-0497368**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
369 Inverness Parkway, Suite 350, Englewood, CO	**80112**
(Address of principal executive offices)	(Zip Code)

(Registrant's Telephone Number, including Area Code): **720-340-4949**

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $0.001 par value per share	LWLG	The NASDAQ Stock Market

Securities registered pursuant to section 12(g) of the Act: None

Indicate by check mark if the Registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☐ No ☒

Indicate by check mark if the Registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☐
Non-accelerated filer ☒
Accelerated filer ☐
Smaller reporting company ☒
Emerging growth company ☐

If an emerging growth company, indicate by checkmark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☐

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to § 240.10D-1(b). ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act of 1934). Yes ☐ No ☒

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant was approximately $358,611,406 as of June 30, 2024.

As of March 18, 2025, there were 124,799,620 shares outstanding of the registrant's common stock, $.001 par value.

Documents incorporated by reference. Portions of the registrant's Definitive Proxy Statement for the registrant's 2025 Annual Meeting of Shareholders are incorporated by reference in Part III of this report. The Definitive Proxy Statement or an amendment to this Form 10-K will be filed with the Securities and Exchange Commission within 120 days after the registrant's fiscal year ended December 31, 2024.

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Forward-Looking Statements

This Annual Report on Form 10-K contains forward-looking statements. Forward-looking statements involve risks and uncertainties, such as statements about our plans, objectives, expectations, assumptions or future events. In some cases, you can identify forward-looking statements by terminology such as “anticipate,” “estimate,” “plan,” “project,” “continuing,” “ongoing,” “expect,” “we believe,” “we intend,” “may,” “should,” “will,” “could” and similar expressions denoting uncertainty or an action that may, will or is expected to occur in the future. These statements involve estimates, assumptions, known and unknown risks, uncertainties and other factors that could cause actual results to differ materially from any future results, performances or achievements expressed or implied by the forward-looking statements. You should not place undue reliance on these forward-looking statements.

Factors that are known to us that could cause a different result than projected by the forward-looking statement, include, but are not limited to:

- inability to generate significant revenue or to manage growth;
- lack of available funding;
- lack of a market for or market acceptance of our products;
- competition from third parties;
- general economic and business conditions;
- intellectual property rights of third parties;
- changes in the price of our stock and dilution;
- regulatory constraints and potential legal liability;
- ability to maintain effective internal controls;
- security breaches, cybersecurity attacks and other significant disruptions in our information technology systems;
- changes in technology and methods of marketing;
- delays in completing various engineering and manufacturing programs;
- changes in customer order patterns and qualification of new customers;
- changes in product mix;
- success in technological advances and delivering technological innovations;
- shortages in components;
- production delays due to performance quality issues with outsourced components;
- those events and factors described by us in Item 1.A “Risk Factors”;
- other risks to which our Company is subject; and
- other factors beyond the Company’s control.

Any forward-looking statement made by us in this Annual Report on Form 10-K is based only on information currently available to us and speaks only as of the date on which it is made. We undertake no obligation to publicly update any forward-looking statement, whether written or oral, that may be made from time to time, whether as a result of new information, future developments or otherwise.

PART I

Item 1. Business.

Overview

Lightwave Logic, Inc. is a technology platform company leveraging its proprietary engineered electro-optic (EO) polymers, named Perkinamine® to transmit data at higher speeds with less power in a small form factor. The Company's high activity and high stability organic polymers allow it to create next-generation photonic EO devices that convert data from electrical signals into light/optical signals for applications in telecommunications, and for data transmission potentially used to support generative AI.

Our differentiation at the modulator device level is in higher speed, lower power consumption, simplicity of manufacturing, small footprint (size), and reliability. We have demonstrated the electro-optic polymers potential for higher speed and lower power consumption in packaged devices, and during 2024, we continued to make advances in techniques to translate our world class material properties to efficient, reliable modulator devices with commercial foundries. We are currently focused on: a) working with potential and existing customers to integrate our proprietary materials into our customers' specific PIC and device architecture; b) testing and demonstrating the superior performance, simplicity of manufacturability and reliability of our devices, including in conjunction with the silicon photonics manufacturing ecosystem; and c) providing our potential and existing customers with the proper Process Development Kits (PDKs) to enable the efficient and fast integration of our materials into their own design and manufacturing plans. Silicon-based foundries are semiconductor fabrication plants developed for the electronics IC business, that are now engaging with silicon photonics to increase their wafer throughput. Partnering with silicon-based foundries not only demonstrates that our polymer technology can be transferred into standard production lines using standard equipment, it also allows us to efficiently utilize our capital. The foundry partnerships will allow us to scale our high-performance polymer optical engines quickly and efficiently. We have now received silicon wafers that range up to 200mm in diameter, which aligns well with foundry manufacturing.

Our extremely strong and broad patent portfolio allows us to optimize our business model in three areas: 1) Traditional focus on polymer materials development, 2) Patent licensing and 3) Technology transfer to foundries. We are continually looking to strengthen our patent portfolio both by internal inventions and acquisition of intellectual property.

We are initially targeting applications in fiber optic data communications and telecommunications markets, in particular ultra-high bandwidth optical connections deployed inside and between datacenters and/or AI clusters. In addition, we are exploring other applications that include automotive/LIDAR, sensing, displays, storage, aerospace and defense, satellites, quantum computing etc., for our polymer technology platform. Our goal is to have our unique polymer technology platform become ubiquitous across multiple market verticals over and above the optical fiber optic communications markets.

Artificial Intelligence (AI) has been integrating deeper within our daily activities with applications to make us more efficient and possibly smarter. The impact on the internet is huge, and the internet is based on an optical network that utilizes data centers to route and switch traffic or information to and from destinations. Data centers are being upgraded today in a fashion that the industry has not seen before with significant investments of capital. The expected demands of increased traffic, information, and data driven by AI is changing the way the internet is being operated. AI is now creating new and interesting market opportunities to upgrade the internet. Three of these opportunities are important today: density, speed, and low power and these are very well aligned with our high performance electro-optic polymers modulator platform. We are designing high performance polymer modulator optical engines to support the rise and growth of AI as it generates more information that will travel through the internet and optical network. While we are not directly an AI company designing electronic processors, we do see immediate benefits of enabling higher levels of information to cross the internet using our optical polymer modulator platform.

Unless the context otherwise requires, all references to the "Company," "we," "our" or "us" and other similar terms means Lightwave Logic, Inc. Also, this Form 10-K Annual Report includes the names of various government agencies and the trade names of other companies. Unless specifically stated otherwise, the use or display by us of such other parties' names and trade names in this report is not intended to and does not imply a relationship with, or endorsement or sponsorship of us by, any of these other parties.

Commencement of Commercial Operations

We commenced commercial operations in May 2023. Presently, our commercial operations consist of a material supply license agreement to provide Perkinamine® chromophore materials for polymer based photonic devices and photonic integrated circuits (PICs). The license agreement represents tangible commercial progress for electro-optic polymers as part of our Company's business plan. Our Company is also in various stages of new materials development and evaluation with potential customers and strategic partners. We expect to continue to obtain a revenue stream from technology licensing agreements, and to obtain additional revenue streams from technology transfer agreements and direct sale of our electro-optic materials. We have seen increased interest in our materials during 2024, driven by the need for higher speed connections to scale the AI-enabled network infrastructure and we are in discussions on future license agreements. In December 2024, we made the decision to focus our commercial and R&D efforts on the EO Polymer materials development and manufacturing. Although we continue to develop full Photonic Integrated Circuits and packaged device designs as part of our internal technology and process development roadmap, we are not actively promoting the sale of such PICs and/or packaged devices to external customers, but rather EO Polymer materials supply and license agreements.

Materials Development

Our Company designs and synthesizes organic chromophores for use in its own proprietary electro-optic *polymer systems* and photonic device designs. A polymer system is not solely a material but also encompasses various technical enhancements necessary for its implementation. These include host polymers, poling methodologies, and molecular spacer systems that are customized to achieve specific optical properties. Our organic electro-optic polymer systems compounds are mixed into solution form that allows for thin film application. Our proprietary electro-optic polymers are designed at the molecular level for potentially superior performance, stability, and cost-efficiency. We believe our proprietary and unique polymers have the potential to replace more expensive, higher power consuming, slower-performance materials such as semiconductor-based modulator devices that are used in fiber-optic communication networks today.

Our patented and patent pending molecular architectures are based on a well-understood chemical and quantum mechanical occurrence known as *aromaticity*. Aromaticity provides a high degree of molecular stability that enables our core molecular structures to maintain stability under a broad range of operating conditions.

We expect our patented and patent-pending optical materials along with trade secrets and licensed materials, to be the core of and the enabling technology for future generations of optical devices, modules, sub-systems, and systems that we will develop or enable our partners to fully commercialize. Examples of our partners include: electro-optic PIC and device design and manufacturing companies, contract manufacturers, original equipment manufacturers, foundries, packaging and assembly manufacturers etc. Our Company contemplates future applications in market verticals that may address the needs of semiconductor companies, optical network companies, Web 2.0/3.0 media companies, high performance computing companies, telecommunications companies, aerospace companies, automotive companies, as well as for example, government agencies and defense entities.

Device Design and Development

Electro-optic Modulators

Our Company designs its own proprietary materials for electro-optical modulation devices. Electro-optical modulators convert data from electric signals into optical signals that can then be transmitted over high-speed fiber-optic cables. Our modulators are electro-optic, meaning they work because the optical properties of the polymers are affected by electric fields applied by means of electrodes. Modulators are key components that are used in fiber optic telecommunications, data communications, and data centers networks etc., to convey the high data flows that have been driven by applications such as pictures, video streaming, movies etc., that are being transmitted through the Internet. Electro-optical modulators are expected to continue to be an essential element as the appetite and hunger for data increases every year as well as the drive towards lower power consumption, and smaller footprint (size).

Current semiconductor photonic technology today is struggling to reach faster device speeds. Our modulator devices, enabled by our electro-optic polymer material systems, work at extremely high frequencies (wide bandwidths) and possess inherent advantages over current crystalline electro-optic material contained in most modulator devices such as bulk lithium niobate (LiNbO3), indium phosphide (InP), silicon (Si), and gallium arsenide (GaAs). Our advanced electro-optic polymer platform is creating a new class of modulators that can be easily integrated into various PIC platforms and can address higher data rates in a lower cost, lower power consuming manner, smaller footprint (size) with much simpler data encoding techniques. Our electro-optic polymer material will boost the performance of standard PIC platforms such as silicon photonics and indium phosphide.

Our electro-optic polymers can be integrated with other materials platforms because they can be applied as a thin film coating in a fabrication clean room such as may be found in semiconductor foundries using standard clean room tooling. These approaches enable our device platforms to not only be competitive but fully integrated with foundries. Our polymers are unique in that they are stable enough to seamlessly integrate into existing CMOS, Indium Phosphide (InP), Gallium Arsenide (GaAs), and other semiconductor manufacturing lines. Of relevance are the integrated silicon photonics platforms that combine optical and electronic functions. These include a miniaturized modulator for ultra-small footprint applications in which we term the Polymer Slot™. This design is based on a slot modulator fabricated into semiconductor wafers that can include either silicon or indium phosphide.

Our Company has a fabrication facility in Colorado to apply standard fabrication processes to our electro-optic polymers which create modulator devices. While our internal fabrication facility is capable of manufacturing modulator devices, we have partnered with commercial silicon-based fabrication companies that are called foundries who can scale our technology with volume quickly and efficiently. The process recipe for fabrication plants or foundries is called a ‘process development kit’ or PDK. We are currently working with commercial foundries to implement our electro-optic polymers into accepted PDKs by the foundries. One of the metrics for successful implementation of PDK is to receive working modulator chips.

Glossary

Glossary of select technology terms to provide you with a better understanding our Company's technology and devices:

Electro-optic devices **-** Electro-optic devices convert data from electric signals into optical signals for use in communications systems and in optical interconnects for high-speed data transfer.

Electro-optic material **-** Electro-optic material is the core active ingredient in high-speed fiber-optic telecommunication systems. Electro-optic materials are materials that are engineered at the molecular level. Molecular level engineering is commonly referred to as "nanotechnology."

Electro-optic modulators **-** Electro-optic (E/O) modulators are electro-optic devices that perform electric-to-optic conversions within the infrastructure of the internet. Data centers may also benefit from this technology through devices that could significantly increase bandwidth and speed while decreasing costs. Polymer E/O modulators can be designed and fabricated with multiple structures. The waveguides allow the light to be efficiently coupled into and out of the modulators, and provide a basis for integrating modulators together.

Gbaud - The rate of symbol changes in data transmission in billions of symbol changes per second. Each symbol can support one or more bits, the number of bits depending on the modulation format.

NRZ – See PAM2.

PAM2 – 2 level Pulse Amplitude Modulation, a modulation format in which the optical power in each symbol can assume either of two different levels, low or high, representing, respectively, a 0 or a 1. PAM2 supports 1 bit per symbol so the bit rate is equal to the baud rate or symbol rate. For example, a modulator capable of supporting 100 Gbaud can transmit 100 Gbps with PAM2 modulation. This modulation format is often called NRZ (Non Return to Zero).

PAM4 - 4 level Pulse Amplitude Modulation, a modulation format in which the optical power in each symbol can assume any one of 4 different levels. PAM4 supports 2 bits per symbol so the bit rate is equal to two times the baud rate or symbol rate. For example, a modulator capable of supporting 100 Gbaud can transmit 200 Gbps with PAM4 modulation.

PAM8 - 8 level Pulse Amplitude Modulation, a modulation format in which the optical power in each symbol can assume any one of 8 different levels. PAM4 supports 3 bits per symbol so the bit rate is equal to three times the baud rate or symbol rate. For example, a modulator capable of supporting 100 Gbaud can transmit 300 Gbps with PAM8 modulation.

Photonic Devices **-** Photonic devices are components for creating, manipulating, or detecting light. This can include modulators, laser diodes, light-emitting diodes, solar and photovoltaic cells, displays and optical amplifiers. Other examples are devices for modulating a beam of light and for combining and separating beams of light of different wavelength.

Polymers - Polymers, also known as plastics, are large carbon-based molecules that bond many small molecules together to form a long chain. Polymer materials can be engineered and optimized using nanotechnology to create a system in which unique surface, electrical, chemical, and electro-optic characteristics can be controlled. Materials based on polymers are used in a multitude of industrial and consumer products, from automotive parts to home appliances and furniture, as well as scientific and medical equipment.

Our Business Opportunity

Lightwave Logic, Inc. is developing our advanced electro-optical polymer material systems. Current legacy technology is based on inorganic crystalline materials, which has allowed for the proliferation of data over fiber optic cables. However, there are inherent molecular deficiencies that have prevented this technology from scaling down in price and up in functionality, especially in terms of $/Gbps. This is primarily due to a closed valence structure that does not allow for the molecular improvements. The valence or valency of an element is a measure of its combining power with other atoms when it forms chemical compounds or molecules. Also, the physical properties of a crystal do not allow for its implementation into highly miniaturize slot structures that are in simple terms the pathways that light travels through in the device.

Organic polymer materials have free electrons that allow for limitless potential to combine with other molecular structures, which allows for multiple options and combinations to improving performance characteristics. Importantly, because they can be applied to optical structures in thin-film liquid form, it is possible to imbue electro-optic ability to highly miniaturized slot structures. Organic polymer materials are also more economic to manufacture in comparison to growing exotic crystals that are prone to contamination and further must be sliced into thin wafers. Our Company believes that the combination of less expensive manufacturing cost, ease of application, and better scalability, together with a lower cost of ownership due to lower heat dissipation (requiring less cooling), will create enormous demand for our polymer material through supply agreements as well as polymer-based products.

Many companies' early attempts at developing commercially reliable organic polymers were stymied due to the difficulty of creating organic molecules that could remain electro-optically active after being subjected to the high heat of semiconductor manufacturing temperatures (such as silicon CMOS, InP, GaAs etc.). These early attempts also encountered difficulty synthesizing materials that could withstand photochemical bleaching (loss of sensitivity to specific frequencies) and material degradation due to high operating temperatures.

Over the last several years, our Company has made various scientific breakthroughs that have allowed for the synthesis of proprietary organic polymer materials that can withstand extremely high process temperatures that exceed 175°C. Additionally, these materials have demonstrated photochemical stability in devices, even after being subjected to high intensity light for over 5,000 hours. These materials also exhibited stable electro-optic performance after being continuously aged at 85°C for over 12,000 hours. This exposure duration far exceeds industry standard stress conditions. These devices have performed with 3dB bandwidths that exceed 70GHz.

We are now further optimizing our electro-optic (EO) polymer materials platform to meet additional specifications that are beginning to be required by the fiber communications industry for applications such as networks running at data rates of 800Gbps and 1600Gbps and 3200Gbps in the future. Our technology platform has the capability and potential to address 4 or more channels of 400Gbps utilizing PAM4 encoding schemes, thus creating a roadmap of increased performance for the industry. Furthermore, we are collaborating with industry partners to optimize device designs and packaging. We have already made extensive progress with our polymer materials on this front, and now we are integrating our robust polymer materials onto an integrated photonics platform.

While our initial focus is to address data communications and telecommunications network applications along with cloud computing/data center needs, we believe that in the future we will have additional opportunities over and above AI to address other applications such as: chip-to-chip and backplane optical interconnects, photovoltaic cells, medical applications, satellite reconnaissance, navigation systems, radar applications, optical filters, spatial light modulators; and all-optical switches.

Electro-Optic Polymer Production – Our Approach vs. the BLA Approach

Our Electro-Optic Material Approach

Our core material expertise relates to the production of high-performance, high-stability electro-optic polymers for high-speed (wide bandwidth) telecommunication and data communications applications. More specifically, it lies in a less mainstream, yet firmly established, scientific phenomenon called aromaticity. Aromaticity causes a high degree of molecular stability. It is a molecular arrangement wherein atoms combine into multi-membered rings and share their electrons among each other. Aromatic compounds are stable because the electronic charge distributes evenly over a great area preventing hostile moieties, such as oxygen and free radicals, from finding an opening to attack.

Previous and Current Competitive Organic Electro-Optic Polymer Efforts

For the past several decades, diverse corporate interests, including, to our knowledge, IBM, Lockheed Martin, DuPont, AT&T Bell Labs, Honeywell, Motorola, HP, 3M, and others in addition to numerous universities and U.S. Government Agencies, have attempted to produce high-performance, high-stability electro-optic polymers for high-speed (wide bandwidth) telecommunication applications. These efforts were largely unsuccessful due, in our opinion, to the industry's singular adherence to an industry pervasive engineering model known as the Bond Length Alternation ("BLA") theory model, which none of our patented molecular designs rely upon. The BLA model, like all other current industry-standard molecular designs, consists of molecular designs containing long strings of atoms called polyene chains. Longer polyene chains provide higher electro-optic performance, but are also more susceptible to environmental threats, which result in unacceptably low-performing, thermally unstable electro-optic polymers.

As a result, high frequency modulators engineered with electro-optic polymers designed on the BLA model or any other polyene chain design models are unstable over typical operating temperature ranges, and often exhibit performance degradation within days, hours or even minutes. Similarly, lower frequency modulators exhibit comparable failings, but to a lesser extent. These flaws, in most cases, have prevented commercial quality polymer-based modulators from entering the commercial marketplace. The thermal stability of these devices does not generally meet the minimum Telcordia GR-468 operating temperature range (-40 degrees Celsius to +85 degrees Celsius) much less the harsher MILSPEC 883D (military specification) range of -55 degrees Celsius to 150 degrees Celsius. While many new applications do not require meeting full military or Telcordia GR-468 specifications for polymers, many potential customers prefer to see polymer operate at or near these conditions to convey confidence in the material system. We understand from initial conversations with data center architects and designers that the temperature specifications that our materials achieve are compliant with their equipment design needs.

We are aware of other academic and commercial development efforts—some by larger companies with vastly more financial resources than we possess. However, we believe that no one yet has developed organic polymer materials that have demonstrated the combination of thermal stability, photochemical stability and reliability that can meet or exceed commercial specifications.

Our Electro-Optic Photonic P^2IC™ Device Approach

Our electro-optic device designs are built around our proprietary organic polymer material systems that we believe will enable better performance than the current embedded legacy technology built around inorganic materials. We also believe that the inherent flexibility of being able to apply our organic polymer materials in liquid thin-film form will accelerate the move toward ultra-miniaturization of Polymer Photonic Integrated Circuits (P^2IC™) by increasing the number of photonic circuits on a single chip. Polymer photonics is the application of polymers on to a platform such as silicon where there are both active and passive photonic component designs. In polymer photonics, polymer devices such as modulators, waveguides, and multiplexers can be fabricated on to a silicon platform that acts as a package as well as a base for mounting lasers (which are needed to source the light). We continue to invest in R&D and process development to help accelerate the adoption of our polymer materials by potential customers into their own PIC platforms, typically based on silicon photonics.

Our initial device, though highly miniaturized, utilizes conventional design and fabrication techniques in the industry. Our future device designs will utilize silicon photonics (SiPh) technology, which can support highly miniaturized slot waveguides structures etched in large format (200mm), low cost, and less expensive silicon wafers coated with our organic electro-optic polymers. The low-cost structure compares well to compound semiconductor technologies such as GaAs (Gallium arsenide) and InP (Indium Phosphide), which suffer from small format wafers that do not allow the economies of scale in high volume fabrication plants. The degree of miniaturization possible of the slot modulator using SiPh is not technically feasible to accomplish with inorganic crystalline materials. Although this may not always remain the case, presently there are nearly insurmountable technical difficulties that are inherent to a crystalline molecule. We now have the capability to model, simulate and design photonic integrated circuits (PICs) in-house.

Our Intellectual Property

Our research and development efforts over the last 10+ years have yielded our Company an extensive patent portfolio as well as critical trade secrets, unpatented technology and proprietary knowledge related to our optical polymer materials. Our intellectual property portfolio has expanded significantly over the few years. We have actively filed technical utility patents and are currently in the process of readying a number of other inventions for formal filings in 2025 and 2026. We expect to continue innovating our technology platform over the next decade. We had additional patents issued or published over the past year indicating that our technology is being recognized as being unique.

In 2018, we acquired the polymer technology intellectual property assets of BrPhotonics Productos Optoelectrónicos S.A., a Brazilian corporation, which significantly advanced our patent portfolio of electro-optic polymer technology with 15 polymer chemistry materials, devices, packaging and subsystems patents and further strengthened our design capabilities to solidify our market position as we prepare to enter the 400Gbps integrated photonics marketplace with a highly competitive, scalable alternative to installed legacy systems.

In 2022, we acquired the polymer technology and intellectual property assets of Chromosol Ltd (UK), which significantly strengthened our Company's design capabilities with foundry PDKs with extremely low temperature atomic layer deposition (ALD) processes that effectively hermetically seal polymer devices that have been prepared for high volume manufacturing. The advanced fabrication processes of ALD with temperatures below 100C will solidify our market position with both the Company's manufacturing foundry partners as well as end-users as we prepare to enter the 800Gbps integrated photonics marketplace. The acquisition also advanced our Company’s patent portfolio of electro-optic polymer technology with an innovative polymer chemistry device patent that has potential to increase the performance of integrated modulators through optical amplification in a photonic integrated circuit (PIC) and enhance the functionality of the PIC by integrating laser light sources made using the polymer-based gain and a laser optical cavity defined on the Silicon photonic platform, with our Company’s high speed, high efficiency modulators.

In total, our patent portfolio currently consists of 77 granted patents that include 46 from the US, 2 from Canada, 3 from the United Kingdom, 18 from the EU, 1 from Japan, 6 from China (including Hong Kong), and 1 from Australia.

Our materials patent portfolio has also strengthened significantly with the filing of additional new patent applications on our core Perkinamine® molecular compounds as well as recent, innovative inventions that are expected to protect our P^2IC polymer PIC platform from potential competition.

Included in our patent portfolio are the following nonlinear optic chromophore designs:

- Stable Free Radical Chromophores, processes for preparing the same
- Stable Free Radical Chromophores, processes for preparing the same
- Tricyclic Spacer Systems for Nonlinear Optical Devices
- Anti-Aromatic Chromophore Architectures
- Heterocyclical Anti-Aromatic Chromophore Architectures
- Heterocyclical Chromophore Architectures
- Heterocyclical Chromophore Architectures with Novel Electronic Acceptor Systems
- Multi-fiber/port hermetic capsule sealed by metallization and method
- Device Design Fabrication Methods
- Modulators and Waveguides
- Hermetic Capsulation

Our patent portfolio includes patents not only on nonlinear optic chromophore designs, but also device designs and inventions, fabrication process inventions, packaging design inventions, as well as novel chemistry to enable high performance, low power, small footprint polymer PIC technology.

Our strategic plan is to utilize our core proprietary technology and leverage our proprietary optical materials to be the core of and the enabling technology for future generations of optical devices, modules, sub-systems and systems that we will develop or potentially out-license to electro-optic device manufacturers. Our Company contemplates future applications that may address the needs of semiconductor companies, automotive/LiDAR companies, sensing companies, aerospace companies and government agencies.

We rely on a combination of patents, patent applications, trademarks, trade secrets and contractual provisions to protect our technologies. Further, employees are required to surrender any inventions or intellectual property developed as part of their employment agreements. We also have a policy of requiring prospective business partners to enter into non-disclosure agreements (NDAs) before disclosure of any of our confidential or proprietary information. Our Company can make no assurances that we will be able to effectively protect our technologies and know-how or that third parties will not be able to develop similar technologies and know-how independently.

Recent Significant Events and Milestones Achieved

During February and March 2018, we moved our Newark, Delaware synthetic laboratory and our Longmont, Colorado optical testing laboratory and corporate headquarters to office, laboratory and research and development space located at 369 Inverness Parkway, Suite 350, Englewood, Colorado. The 13,420 square feet Englewood facility includes fully functional 1,000 square feet of class 1,000 cleanroom, 500 square feet of class 10,000 cleanroom, chemistry laboratories, and analytic laboratories. The Englewood facility streamlines all of our Company's research and development workflow for greater operational efficiencies.

During June 2018, our Company Acquired the Polymer Technology Intellectual Property Assets of BrPhotonics Productos Optoelectrónicos S.A., a Brazilian corporation, which significantly advanced our patent portfolio of electro-optic polymer technology with 15 polymer chemistry materials, devices, packaging and subsystems patent and further strengthened our design capabilities to solidify our market position as we prepare to enter the 400Gbps integrated photonics marketplace with a highly competitive, scalable alternative to installed legacy systems.

On September 1, 2021, our Company's common shares began trading on the Nasdaq Capital Market ("Nasdaq"). The Company's Nasdaq listing will help to expand our potential shareholder base, improve liquidity, elevate our public profile within the industry and should ultimately enhance shareholder value.

On November 29, 2022, we announced our acquisition of the polymer technology and intellectual property assets of Chromosol Ltd (UK). The acquisition significantly strengthened our Company's design capabilities with foundry PDKs with extremely low temperature atomic layer deposition (ALD) processes that effectively hermetically seal polymer devices that have been prepared for high volume manufacturing. Having access to extremely low temperature ALD allows our Company's polymer modulators to be protected from the environment without the need for expensive and large footprint gold box packaging, propelling our Company forward with chip-scale packaging as required by major hyper-scaler end-users.

Since the acquisition, our Company has made substantially progress in the utilization of ALD to hermetically seal polymers for modulator applications.

On December 12, 2022, we announced the receipt of U.S. patent number 11,506,918 B2 entitled "Hybrid electro-optic polymer modulator with atomic layer deposition (ALD) sealant layer," which allows our proprietary polymers to be sealed to moisture and atmospheric gases in a very low temperature and quasi-hermetic environment through the use of a chip-scale packaging approach that can be applied in parallel at wafer level (i.e. in volume) and that eliminates the need for a separate hermetic enclosure or "gold box." Specifically, our electro-optic polymer modulators will be sealed with low-temperature conformal atomic layer deposition dielectric layers that are supported on a silicon substrate with passive silicon photonics waveguides. The sealant process will enable lower cost system implementation in a high-volume foundry environment.

On March 22, 2023, we announced that our latest commercial-class electro-optic polymer material achieved breakthrough performance metrics at 1310 nanometers (nm), a wavelength popular in hyperscale datacenter applications. These commercial-class improvements include a significantly higher electro-optic coefficient exceeding 200 pm/V, which allows for very low drive power of 1 volt or less. Other characteristics include optimized chromophore loading, superior low optical loss, excellent temporal stability at 85^0 Celsius, and extremely high thermal and photo stability. The breakthrough commercial-class electro-optic material is expected to enable ultra-small footprint modulators with at least 100 GHz bandwidth as well as meeting all critical requirements for pluggable transceivers, on-board optics and co-packaging solutions. Additionally, the achievement of these results at the 1310nm bandwidth positions us for potential near-term licensing opportunities in datacenter applications.

On May 25, 2023, we announced our Company's first commercial material supply license agreement for our Perkinamine® chromophore materials. This agreement is to provide Perkinamine® chromophore materials for polymer based photonic devices and photonic integrated circuits (PICs). Supplying licensed materials is one prong of our Company's three-prong revenue model and business strategy that includes polymer modulator products as well as technology transfer. This agreement recognizes market acceptance and competitive advantage of our technology and validates the first prong of our business model. Further, it represents tangible commercial progress for electro-optic polymers as part of our business plan.

On May 31, 2023, we announced the receipt of U.S. patent number 11,661,428 entitled "Nonlinear Optical Chromophores, Nonlinear Optical Materials Containing the Same, and Uses Thereof in Optical Devices," which details an innovative organic chromophore design using a novel 'thiophene bridge' to significantly improve material performance in a production environment. This is accomplished by designing thiophene-containing bridging groups that are positioned between the electron-donating and electron-accepting ends of the chromophore. These designs provide nonlinear optical chromophores with significantly improved optical properties and improved stability. We expect this patent will help us progress our commercial discussions with potential customers.

On August 21, 2023, we announced the completion of new laboratory production facilities, expanding our corporate headquarters by over 65%, nearly 10,000 square feet, for a total of approximately 23,500 square feet to support new commercial activity, including enabling commercial device testing and evaluation, production reliability testing, laser characterization, SEM analysis and the expansion of our Company's chemical synthesis production line.

On March 24, 2024, at the 2024 Optical Fiber Conference in San Diego, California (OFC 2024), we presented world-class results for our Company’s 200Gbps heterogeneous polymer/silicon photonic modulator at a record low drive voltage, which are based on a novel packaged heterogeneous polymer EO modulator design leveraging silicon photonics devices from a 200mm production foundry process and Lightwave Logic’s proprietary high temperature, high performance EO Polymer material. Each modulator was operated at 100GBaud PAM4 and achieved all drive voltages below 2V, and as low as 1V which is excellent for low power operation. We discussed the test set-up for the high-speed results, and how electro-optic polymer-based modulators based on 200mm silicon foundry wafers are ideal for 4 lane 200Gbps per lane 800Gbps pluggable optical transceivers for datacenter applications. We also shared updated lifetime and reliability data for both the electro-optic polymer materials and electro-optic polymer devices. Our results demonstrate that a hybrid approach, leveraging the cost and integration benefits of silicon photonics along with the unparalleled bandwidth and low power advantages of Lightwave Logic’s proprietary EO polymers, lays a clear path for competitive performance and integration for today’s and future optical pluggable transceivers, and we expect these results will position our Company to support the burgeoning demand of generative AI as datacenters around the world begin to upgrade their hardware faster than expected to meet the demands of the future.

On March 28, 2024, we announced world-class performance of the Company’s Perkinamine® EO polymer material operating in an optical interconnect link, at 437.1Gbps employing a PAM8 178GBaud signal encoded by a plasmonic Mach Zehnder modulator (MZM). In this work, intensity modulated, direct detection (IM/DD) techniques were utilized to drive higher performance. The paper, authored by our teammates ETH Zurich and Polariton Technologies, demonstrated data rates beyond 400Gbps for a IM/Dd optical interconnect link for the first time. This world-class result, achieving data rates of 400Gbps per lane, demonstrates that our Company’s EO polymers are capable of exceeding double the current industry expectation. This has the potential to enable 4 lane 1.6Tbps (1600Gbps) pluggable transceiver modules, which is on the roadmap of datacenter operators today.

On May 21, 2024, we announced our collaboration with Advanced Micro Foundry (AMF), a leading Silicon Photonics volume foundry, to develop state-of art polymer slot modulators utilizing AMF's silicon photonics platform. These modulators have been shown to achieve a record low drive voltage below 1V and data rates of 200Gbps PAM4. This performance will enable a new generation of 800 Gb/s and 1.6T Gb/s pluggable transceivers to address fast growing requirements for optical connectivity for large generative AI computing clusters. Lightwave Logic and AMF have collaborated over the past year to develop the electro optic polymer slot modulators utilizing AMF's standard manufacturing process flow on 200-mm wafers. This successful demonstration marked a significant milestone in integrated photonics, blending Silicon photonics with polymer materials. Building on this demonstration, both parties are aiming to enhance the modulators to ensure these advanced components are readily accessible to product companies on a manufacturing scale. This accomplishment puts our Company in a very strong position to ramp volume both for our polymers as well as 200-mm silicon wafer volume with AMF. It also opens exciting opportunities to develop novel solutions for commercial-grade-compatible EO polymer modulators seamlessly integrated with AMF's standard processes.

On September 24, 2024, we announced a collaboration with Polariton Technologies to demonstrate a packaged device with over 110 GHz super high bandwidth packaged electro-optic polymer modulators using Polariton's plasmonic modulator device design that contains Lightwave's proprietary Perkinamine® chromophores at the European Conference on Optical Communications (ECOC) held in Frankfurt, Germany from September 22-26, 2024. The packaged device contains a plasmonic modulator using electro-optic polymer material and platform chips have demonstrated 400 Gbps, which is the current specification that datacenters are looking for in optical transceiver modules. This collaboration forms an important technology platform for scalability using large silicon foundries for mass commercialization with 200mm silicon wafers. The combination of electro-optic polymers and plasmonics can support datacenters around the world which are responding to high power consumption and the burgeoning demand for higher speed data transmission from artificial intelligence, machine learning, and other cloud-based services. This device enables ultra-high bandwidths, which are extremely well suited for next generation internet and optical networking transceivers that require 200Gbps per lane today, and 400Gbps per lane soon.

On December 11, 2024, we strengthened our Company's management team to reinforce our competitive position and accelerate product and commercial strategic initiatives, including capitalizing on high-growth opportunities across the AI and datacenter networking sector, expediting commercialization for our proprietary electro-optic materials, and opening new markets and applications for our advanced polymer-based solutions. We named optical communications industry veteran Yves LeMaitre as our Chief Executive Officer and former CEO and Chairman Thomas E. Zelibor as our President. Ronald Bucchi, lead independent director, was appointed as our new non-executive independent Chairman, and James S. Marcelli, principal financial officer, was named as our Chief Financial Officer and continues to serve as Chief Operating Officer. Dr. Michael Lebby retired as Chairman and Chief Executive Officer of Lightwave Logic, effective December 10, 2024.

On March 10, 2025, we announced the advancement of our technical collaboration with Polariton Technologies, a technology leader of high-speed EO components for the communication market, and our transition from being a material supplier to collaborating on market development through end-user engagement and technical cooperation. Lightwave Logic and Polariton will work together to jointly develop technical solutions to enable the faster adoption and integration of combined plasmonics and polymer-based products, with semiconductor fabrication plants, outsourced assembly, and test operations. In addition to manufacturing transmitter PICs with inherent superior electro-optic performance, both teams will be working together on an extensive qualification and reliability program, high-speed RF and optical testing and back-end manufacturing process integration.

As we move forward to diligently meet our goals, we continue to work closely with our packaging and foundry partners for 200Gbps and 400Gbps/lane device designs and prototypes, and we are advancing our reliability and characterization efforts to support our prototyping. Our partnership with silicon-based foundries will allow us to scale commercial volumes of electro-optic polymer modulator devices using large silicon wafers, and we are currently working to have our fabrication processes accepted into foundry PDKs (process development kits). These are the recipes that foundries use to manufacture devices in their fabrication plants.

We are actively engaged with test equipment manufacturers of the most advanced test equipment to test our state-of-the-art polymer devices. We continue to engage with multiple industry bodies to promote our roadmap. We continue to fine tune our business model with target markets, customers, and technical specifications. Our business model includes the licensing of our strong IP and Patent portfolio, as well as technology transfer to entities such as foundries. Discussions with prospective customers are validating that our materials are ideally suited for the datacenter, AI connectivity and telecommunications markets. Details and feedback of what these prospective customers are seeking from a prototype are delivered to our technical team.

The Global Photonic Device Market and Our Target Markets

Our initial target market is the AI focused datacenter eco-system that is exponentially expanding to address the need for accurate Large Language Models – LLMs - for a variety of applications. To address these requirements, datacenters have grown in number and scope to include hundreds of thousands of servers, switches and associated equipment per datacenter to address the computing needs required for LLMs – a process often known as “scaling up and scaling out”. The number of “hyperscale” datacenters are expected to continue to increase in number both in the US, but also in the rest of the world.

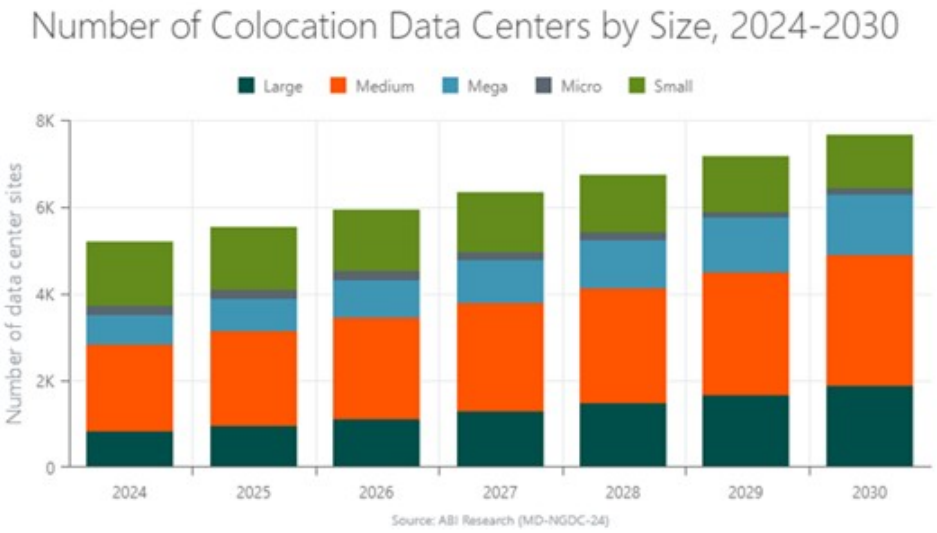


Figure 1: Number of Data Center Sites (by Size)
Source: “How Many Data Centers Are There and Where Are They being Built”, Yih-Khai Wong, ABI Research, July 16, 2024

A “single” hyperscale datacenter may consist of multiple large warehouse-size buildings on a campus or even several locations distributed around a metropolitan area. Regardless of the design, these datacenters will require transmitting and receiving vast amounts of data - not only around a single data center building – but often also between buildings in distributed data center architecture. The connectivity required between servers, switches and related electronics within a single datacenter building is often shorter than 500 meters, with a growing requirement for opto-electronics for connecting equipment that may be in facilities that are up to 10km apart. The ideal method for addressing these links has been – and will continue to be - single mode fiber cabling. Correspondingly, the minimum “speeds” or bandwidth required for transmitting data on these connections is expected to be 800Gigabits/second – a speed that eventually be supplanted with 1.6Terabit/second and 3.2 Terabit/second connections, (2 times and 4 times faster than 800Gibaits/second), as shown in Figure 2. Each connection speed will require either 4 or 8 modulators which results in a multimillion unit opportunity on a yearly basis.

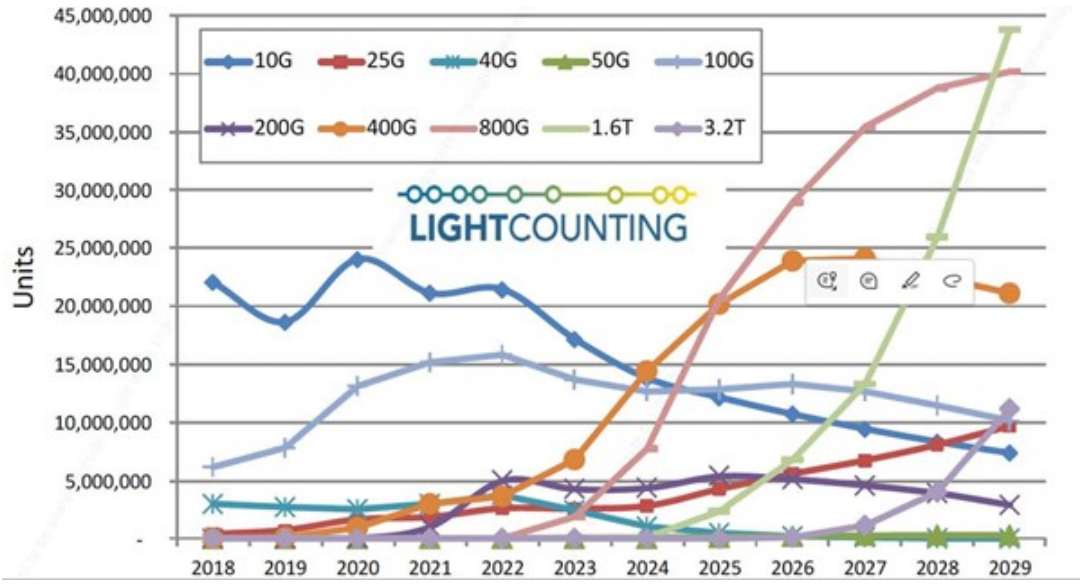


Figure 2: Number of Opto-Electronic Connectivity Requirements (by “speed”)
Source: “Optical Communications market Forecast”, Lightcounting, October, 2024

The combined growth in number of datacenters and speed requirements has generated considerable discussion of the need for reduction in the growth of energy demands needed for operations. Our polymers will enable low power modulators that will be required for the opto-electronics utilized for interconnecting the switches and servers deployed at these required speeds on this cabling infrastructure.

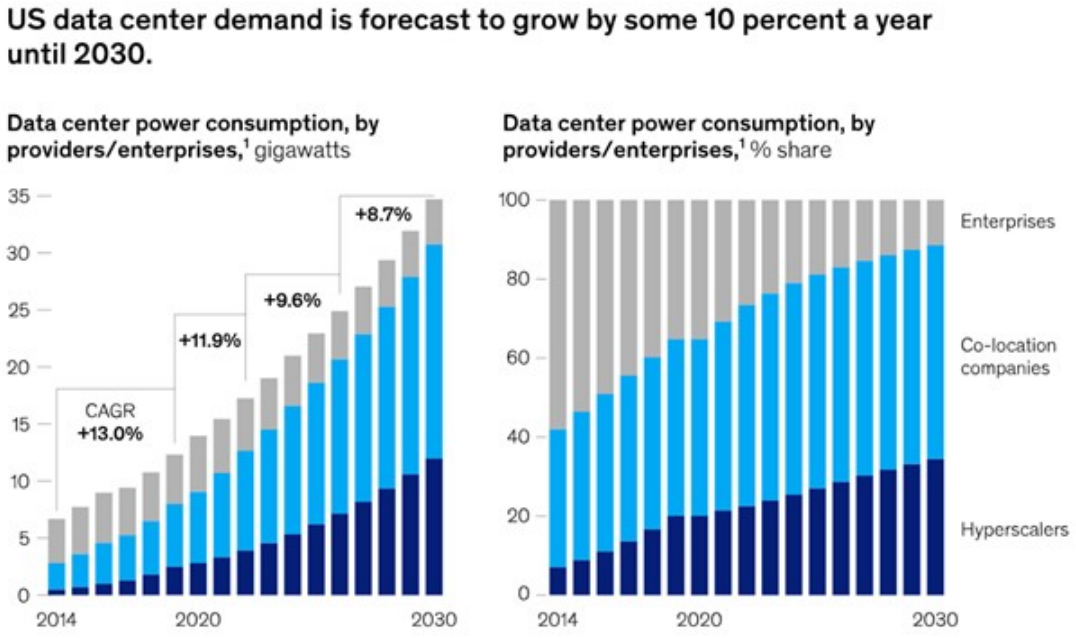


Figure 3: Datacenter Power Consumption Forecast
Source: “Investing in the Rising Data Center Economy”, McKinsey, January 17, 2023

Business Strategy

Our first revenue stream was obtained from our entry into a material supply license agreement to provide Perkinamine® chromophore materials for polymer based photonic devices and photonic integrated circuits (PICs). Our Company is also in various stages of materials development and evaluation with potential customers and strategic partners. We expect to continue to obtain a revenue stream from technology licensing agreements, and to obtain additional revenue streams from technology transfer agreements and direct sale of our electro-optic Perkinamine® chromophore material.

Specifically, our business strategy provides that our revenue stream will be derived from one or some combination of the following: (i) technology licensing for specific product application; (ii) joint venture relationships with significant industry leaders; and (iii) the production and direct sale of our own electro-optic materials. Our objective is to be a leading provider of proprietary technology and know-how in the electro-optic device market. In order to meet this objective, we intend to continue to:

- Further the development of proprietary organic electro-optic polymer material systems.
- Partner with PIC or packaged device design and manufacturing companies to further the development of PDKs for our polymer material.
- Develop proprietary intellectual property.
- Grow our commercial device design and development capabilities.
- Partner with silicon-based foundries who can scale volume quickly and integrate our materials into their infrastructure.
- Grow our product reliability and quality assurance capabilities.
- Grow our optoelectronic and RF testing capabilities.
- Grow our commercial material manufacturing capabilities.
- Maintain/develop strategic relationships with major telecommunications and data communications companies to further the awareness and commercialization of our technology platform.
- Add high-level personnel with industrial and manufacturing experience in key areas of our materials and process development programs.

Create Organic Polymer-Enabled Electro-Optic Modulators

We intend to utilize our proprietary optical polymer technology to enable the creation by our customers of a portfolio of commercial electro-optic polymer product devices with applications for various markets, including telecommunications, data communications and data centers.

We expect our -polymer material to be used initially in modulator products that will operate at symbol rates at least 112 Gigabaud which is roughly 200Gbps when utilized with PAM4 encoding schemes. Our devices are highly linear and can also enable the performance required to take advantage of more advanced complex encoding schemes if required.

Our Research and Development Process

Our research and development process consists of the following steps:

- We develop novel polymer materials utilizing our patented and patent pending technology to meet certain performance specifications. We then develop methods to synthesize larger quantities of such material.
- We conduct a full battery of tests at the completion of the synthesis of each new polymer material to evaluate its characteristics. We also create development strategies to optimize materials to meet specifications for specific applications. We model and simulate each new polymer material so that we can further understand how to optimize the material for device operation.
- We integrate data from the material characterization and test results to fabricate sample devices for internal use. We analyze device-testing results to refine and improve fabrication processes and methods. In addition, we investigate alternative material and design variations to possibly create more efficient fabrication processes.
- We create an initial device design using simulation software. Following device fabrication, we run a series of optical and electronic tests on the device.
- We are developing PDKs with commercial silicon-based foundries so that our technology can transfer seamlessly to larger silicon wafer fabrication plants, and scale in volume quickly.

We have and expect to continue to make significant operating and capital expenditures for research and development. Our research and development expenses were $16,806,548 and $15,903,689, for the years ended December 31, 2024, and 2023, respectively.

Our Past Government Program Participation

Our Company has been a participant in several vital government sponsored research and development programs with various government agencies that protect the interests of our country. The following is a list of some of the various divisions of government agencies that have provided us with advisory, financial and/or materials support in the pursuit of high-speed electro-optic materials. Our previous relationships included:

- National Reconnaissance Office (NRO)
- Properties Branch of the Army Research Laboratory on the Aberdeen Proving Grounds in Aberdeen, Maryland
- Defense Advance Research Project Agency (DARPA)
- Naval Air Warfare Center Weapons Division in China Lake, California
- Air Force Research Laboratory at Wright-Patterson Air Force Base in Dayton, Ohio

We are aware of a multitude of government programs that include for example the Chips and Science Act amongst others. As noted above, we are not currently partnered with or financially supported by any governmental agency at this time, however, we are exploring future opportunities as our Company grows and gains the additional resources and personnel necessary to support these efforts.

Our Competition

Competitors

The markets we are targeting for our electro-optic polymer technology are intensely competitive. While there are no major multi-national companies that compete directly with us on electro-polymers, there are other companies that do manufacture optical modulators based on alternative material platforms such as Indium Phosphide, Silicon or Silicon Nitride and Lithium Niobate. These companies that have incumbent optical modulators using semiconductors include: Lumentum, Broadcom, Marvell, Cisco, Intel, Ciena, Fujitsu, and Coherent. These companies are heavily invested in the production of crystalline-based semiconductor electro-optic modulator technologies, as well as the development of novel manufacturing techniques and modulator designs.

Smaller companies that compete with us on optical modulators using new and novel technologies include: Hyperlite (who are developing thin film lithium niobate (TFLN), NLM Photonics (organic hybrid polymer) and Lumiphase (who are developing Barium Titanate or BTO).

Our Plan to Compete

We believe that as our organic polymer technology gains industry acceptance, we will be poised to obtain a significant portion of the component manufacturing market and have our technology become ubiquitous. Electro-optic polymers demonstrate several advantages over other technologies, such as inorganic-based technologies, due to their reduced manufacturing and processing costs, higher performance, and lower power requirements. Our patented organic polymers and future electro-optic photonic devices have demonstrated significant stability advantages over our known competitor's materials.

We believe the principal competitive factors in our target markets are:

- The ability to develop and commercialize highly stable optical polymer-based materials and optical devices in commercial quantities.
- The ability to obtain appropriate patent and proprietary rights protection.
- The ability to create commercial silicon-based PDKs for our electro-optic polymers.
- Lower cost, high production yield for these products.
- The ability to enable integration and implement advanced technologies.
- Strong sales and marketing, and distribution channels for access to products.

We believe that our current business planning will position our Company to compete adequately with respect to these factors. Our future success is difficult to predict because we are an early-stage company with most of products still in development.

Many of our existing and potential competitors have substantially greater research and product development capabilities and financial, scientific, marketing and human resources than we do. As a result, these competitors may:

- Succeed in developing products that are equal to or superior to our products and future products or that achieve greater market acceptance than our products and future products.
- Devote greater resources to developing, marketing or selling their products.
- Respond quickly to new or emerging technologies or scientific advances and changes in customer requirements, which could render our technologies or products obsolete.
- Introduce products that make the continued development of our products and/or future products uneconomical.
- Obtain patents that block or otherwise inhibit our ability to develop and commercialize our future products.
- Withstand price competition more successfully than we can.
- Establish cooperative relationships among themselves or with third parties that enhance their ability to address the needs of our prospective customers.
- Take advantage of acquisition or other opportunities more readily than we can.

Employees and Human Capital

We currently have 31 full-time employees, and we retain several independent contractors on an as-needed basis. Based on our current development plan we expect to add 4 additional full-time employees in 2025.

People

As a technology and innovation-driven company, we depend on a highly skilled workforce. Attracting, developing, advancing and retaining the best talent is critical for us to execute our strategy and grow our business. Individuals with technical, engineering, chemistry and other science backgrounds, experience, or interests are particularly important for us to succeed. We strive to advance a diverse, equitable and inclusive work environment.

Technical Team

Our team is composed of world-class technologists, including materials scientists, design engineers, device engineers, synthetic organic chemists, test and material engineers and technicians.

Diversity and Inclusion

We work to create a culture of diversity and inclusion so that all of our employees feel they are respected and treated equally, regardless of gender, race, ethnicity, age, disability, sexual orientation, gender identity, cultural background or religious belief.

Compensation and benefits

Our total rewards package includes market-competitive pay, stock option grants and bonuses, healthcare benefits, retirement savings plans, life insurance, disability insurance, paid time off and family leave, and flexible work schedules.

The principal purposes of our equity incentive plan is to attract and retain employees who will contribute to our Company's long range success, to provide incentives that align the interests of our employees with those of our shareholders, and to promote the success of our Company's business.

Health and Safety

We are committed to providing a healthy environment and safe workplace by operating in accordance with established health and safety protocols within our facility and maintaining a strong health and safety compliance program. We prioritize, manage, and carefully track safety performance at our facility and integrate sound safety practices in every aspect of our operations. We regularly conduct self-assessments to examine our safety culture and processes.

Available Information

We maintain a website at www.lightwavelogic.com. We make available on our website under "Investors" – "SEC Filings," free of charge, our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports as soon as reasonably practicable after we electronically file or furnish such material with the SEC. References to our website in this report are provided as a convenience, and the information on our website is not, and shall not be deemed to be a part of this Annual Report on Form 10-K or incorporated into any other filings we make with the SEC. The SEC maintains an Internet site (www.sec.gov) that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. In addition, we make available on our website under "Leadership" – "Governance Documents", free of charge, our Audit Committee Charter, Compensation Committee Charter, Nominating And Corporate Governance Committee Charter, Operations Committee Charter and Code of Ethics and Business Conduct. In addition, the foregoing information is available in print, without charge, to any stockholder who requests these materials from us.

Item 1A. Risk Factors.

Investing in our common stock is risky. In addition to the other information contained in this Annual Report on Form 10-K, you should consider carefully the following risk factors in evaluating our business and us. If any of the following events actually occur, our business, operating results, prospects or financial condition could be materially and adversely affected. This could cause the trading price of our common stock to decline and you may lose all or part of your investment. The risks described below are not the only ones that we face. Additional risks not presently known to us or that we currently deem immaterial may also significantly impair our business operations and could result in a complete loss of your investment.

We have incurred substantial operating losses since our inception and will continue to incur substantial operating losses for the foreseeable future.

Since our inception, we have been engaged primarily in the research and development of our electro-optic polymer materials technologies and products. As a result of these activities, we incurred significant losses and experienced negative cash flow since our inception. We incurred a net loss of $22,535,041 for the year ended December 31, 2024, and $21,038,032 for the year ended December 31, 2023. We anticipate that we will continue to incur operating losses through at least 2025.

We may not be able to generate significant revenue either through customer contracts for our existing or future products or technologies or through development contracts from the U.S. government or government subcontractors. We expect to continue to make significant operating and capital expenditures for research and development and to improve and expand production, sales, marketing and administrative systems and processes. As a result, we will need to generate significant revenue to achieve profitability. We cannot assure you that we will ever achieve profitability.

We are subject to the risks frequently experienced by early-stage companies.

The likelihood of our success must be considered in light of the risks frequently encountered by early-stage companies, especially those formed to develop and market new technologies. These risks include our potential inability to:

- Establish significant product sales and marketing capabilities;
- Establish and maintain significant markets for our products and future products;
- Identify, attract, retain and motivate qualified personnel;
- Continue to develop and upgrade our technologies to keep pace with changes in technology and the growth of markets using polymer-based materials;
- Develop expanded product production facilities, along with silicon-based foundry and other outside contractor relationships; and
- Maintain our reputation and build trust with customers.

Our failure to effectively manage our growth and effectively transition from our focus on research and development activities to commercial operations could harm our business.

Failure to manage growth of operations could harm our business. To date, a large number of our activities and resources have been directed at the research and development of our technologies and development of potential related products including work in association with external partners. The transition from a focus on research and development to being a vendor of products requires effective planning and management. Additionally, growth arising from expected synergies from any future acquisitions will require effective planning and management. Future expansion will be expensive and will likely strain management and other resources.

In order to effectively manage growth, we must:

- Continue to develop an effective planning and management process to implement our business strategy;
- Hire, train and integrate new personnel in all areas of our business;
- Expand our facilities and increase capital investments; and
- Continue to successfully partner with silicon-based foundries.

We cannot assure you that we will be able to accomplish these tasks effectively or otherwise effectively manage our growth.

We will require additional capital to continue to fund our operations and if we do not obtain additional capital, we may be required to substantially limit our operations.

Our business does not presently generate the cash needed to finance our current and anticipated operations. Based on our current operating plan and budgeted cash requirements, we believe that we have sufficient funds to finance our operations through April 2026; however, we will need to obtain additional future financing after that time to finance our operations until such time that we can conduct profitable revenue-generating activities. We expect that we will need to seek additional funding through public or private financings, including equity financings, and through other arrangements, including collaborative arrangements. Poor financial results, unanticipated expenses or unanticipated opportunities could require additional financing sooner than we expect. Other than with respect to (i) the purchase agreement for up to $30 million we entered into with Lincoln Park on February 28, 2023 (the "**2023 Purchase Agreement**"); (ii) the purchase agreement for up to $30 million we entered into with Lincoln Park on March 17, 2025 (the "**2025 Purchase Agreement**"); and (iii) the sales agreement for up to $35 million we entered into with Roth Capital Partners, LLC ("**Roth Capital**") on December 9, 2022 (the "**Roth Sales Agreement**"); we have no plans or arrangements with respect to the possible acquisition of additional financing, and such financing may be unavailable when we need it or may not be available on acceptable terms. We currently have a remaining amount of $0 million and $30 million pursuant to the 2023 Purchase Agreement and 2025 Purchase Agreement with Lincoln Park, subject to the conditions set forth therein, respectively, and $31.5 million that is available to our Company pursuant to the Roth Sales Agreement with Roth Capital.

Our forecast of the period of time through which our financial resources will be adequate to support our operations is a forward-looking statement and involves risks and uncertainties, and actual results could vary as a result of a number of factors, including the factors discussed elsewhere in this Annual Report on Form 10-K. We have based this estimate on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect.

Additional financing may not be available to us, due to, among other things, our Company not having a sufficient credit history, income stream, profit level, asset base eligible to be collateralized, or market for its securities. If we raise additional funds by issuing equity or convertible debt securities, the percentage ownership of our existing shareholders may be reduced, and these securities may have rights superior to those of our common stock. If adequate funds are not available to satisfy our long-term capital requirements, or if planned revenues are not generated, we may be required to substantially limit our operations.

We are entering new markets, and if we fail to accurately predict growth in these new markets, we may suffer substantial losses.

We are initially targeting applications in fiber optic data communications and telecommunications markets, in particular ultra-high bandwidth optical connections deployed inside and between datacenters and/or AI clusters. In addition, we are exploring other applications that include automotive/LIDAR, sensing, displays, storage, aerospace and defense, satellites, quantum computing etc., for our polymer technology platform. We expect to continue to develop products for these markets and to seek to identify new markets. These markets change rapidly, and we cannot assure you that they will grow or that we will be able to accurately forecast market demand, or lack thereof, in time to respond appropriately. Our investment of resources to develop products for these markets may either be insufficient to meet actual demand or result in expenses that are excessive in light of actual sales volumes. Failure to predict growth and demand accurately in new markets may cause us to suffer substantial losses. In addition, as we enter new markets, there is a significant risk that:

- The market may not accept the price and/or performance of our products;
- There may be issued patents we are not aware of that could block our entry into the market or could result in excessive litigation; and
- The time required for us to achieve market acceptance of our products may exceed our capital resources that would require additional investment.

Our plan to develop relationships with strategic partners may not be successful.

Part of our business strategy is to maintain and develop strategic relationships with private firms, such as packaging companies and silicone-based foundries, and to a lesser extent, government agencies and academic institutions, to conduct research and development and testing of our products and technologies. For these efforts to be successful, we must identify partners whose competencies complement ours. We must also successfully enter into agreements with them on terms attractive to us, and integrate and coordinate their resources and capabilities with our own. We may be unsuccessful in entering into agreements with acceptable partners or negotiating favorable terms in these agreements. Also, we may be unsuccessful in integrating the resources or capabilities of these partners. In addition, our strategic partners may prove difficult to work with or less skilled than we originally expected. If we are unsuccessful in our collaborative efforts, our ability to develop and market products could be severely limited.

The failure to establish and maintain collaborative relationships may have a materially adverse affect on our business.

We are initially targeting applications in fiber optic data communications and telecommunications markets, in particular ultra-high bandwidth optical connections deployed inside and between datacenters and/or AI clusters. In addition, we are exploring other applications that include automotive/LIDAR, sensing, displays, storage, aerospace and defense, satellites, quantum computing etc., for our polymer technology platform. Our ability to generate significant revenues depends significantly on the extent to which potential customers and other potential industry partners develop, promote and sell systems that incorporate our products, which, of course, we cannot control. Any failure by potential customers and other potential industry partners to successfully develop and market systems that incorporate our products could adversely affect our sales. The extent to which potential customers and other industry partners develop, promote and sell systems incorporating our products is based on a number of factors that are largely beyond our ability to control.

We may participate in joint ventures that expose us to operational and financial risk.

We may participate in one or more joint ventures for the purpose of assisting us in carrying out our business expansion, especially with respect to new product and/or market development. We may experience with our joint venture partner(s) issues relating to disparate communication, culture, strategy, and resources. Further, our joint venture partner(s) may have economic or business interests or goals that are inconsistent with ours, exercise their rights in a way that prohibits us from acting in a manner which we would like, or they may be unable or unwilling to fulfill their obligations under the joint venture or other agreements. We cannot assure you that the actions or decisions of our joint venture partners will not affect our operations in a way that hinders our corporate objectives or reduces any anticipated cost savings or revenue enhancement resulting from these ventures.

If we fail to develop and introduce new or enhanced products on a timely basis, our ability to attract and retain customers could be impaired and our competitive position could be harmed.

We plan to operate in a dynamic environment characterized by rapidly changing technologies and industry standards and technological obsolescence. To compete successfully, we must design, develop, market and sell products that provide increasingly higher levels of performance and reliability and meet the cost expectations of our customers. The introduction of new products by our competitors, the market acceptance of products based on new or alternative technologies, or the emergence of new industry standards could render our anticipated products obsolete. Our failure to anticipate or timely develop products or technologies in response to technological shifts could adversely affect our operations. In particular, we may experience difficulties with product design, manufacturing, marketing or certification that could delay or prevent our development, introduction or marketing of products. If we fail to introduce products that meet the needs of our customers or penetrate new markets in a timely fashion our Company will be adversely affected.

Our future growth will suffer if we do not achieve sufficient market acceptance of our organic nonlinear optical materials.

We expect our patented and patent-pending optical materials along with trade secrets and licensed materials, to be the core of and the enabling technology for future generations of optical devices, modules, sub-systems and systems that we will develop or out-license to electro-optic device manufacturers. Most of our materials are still in the development stage, and we do not know when a market for our materials will develop, if at all. Our success depends, in part, upon our ability to gain market acceptance of our organic nonlinear optical materials. To be accepted, our materials must meet the technical and performance requirements of our potential customers. OEMs, suppliers or government agencies may not accept polymer-based materials. In addition, even if we achieve some degree of market acceptance for our materials in one industry, we may not achieve market acceptance in other industries that we are targeting. Also, certain large corporations may be predisposed against doing business with a company of our limited size and operating history.

Our potential customers require our products to undergo a lengthy and expensive qualification process, which does not assure product sales.

Prior to purchasing our products, our potential customers will require that our products undergo extensive qualification processes. These qualification processes may continue for several months or more. However, qualification of a product by a customer does not assure any sales of the product to that customer. Even after successful qualification and sales of a product to a customer, a subsequent revision to the product, changes in our customer's manufacturing process or our selection of a new supplier may require a new qualification process, which may result in additional delays. Also, once one of our products is qualified, it could take several additional months or more before a customer commences volume production of components or devices that incorporate our products. Despite these uncertainties, we are devoting substantial resources, including design, engineering, sales, marketing and management efforts, to qualifying our products with customers in anticipation of sales. If we are unsuccessful or delayed in qualifying any of our products with a customer, sales of our products to a customer may be precluded or delayed, which may impede our growth and cause our business to suffer.

Obtaining a sales contract with a potential customer does not guarantee that a potential customer will not decide to cancel or change its product plans, which could cause us to generate no revenue from a product and adversely affect our results of operations.

Even after we secure a sales contract with a potential customer, we may experience delays in generating revenue from our products as a result of a lengthy development cycle that may be required. Potential customers will likely take a considerable amount of time to evaluate our products; it could take 12 to 24 months from early engagement by our sales team to actual product sales. The delays inherent in these lengthy sales cycles increase the risk that a customer will decide to cancel, curtail, reduce or delay its product plans, causing us to lose anticipated sales. In addition, any delay or cancellation of a customer's plans could materially and adversely affect our financial results, as we may have incurred significant expense and generated no revenue. Finally, our customers' failure to successfully market and sell their products could reduce demand for our products and materially and adversely affect our business, financial condition and results of operations. If we were unable to generate revenue after incurring substantial expenses to develop any of our products, our business would suffer.

Many of our products will have long sales cycles, which may cause us to expend resources without an acceptable financial return and which makes it difficult to plan our expenses and forecast our revenue.

Many of our products will have long sales cycles that involve numerous steps, including initial customer contacts, specification writing, engineering design, prototype fabrication, pilot testing, regulatory approvals (if needed), sales and marketing and commercial manufacture. During this time, we may expend substantial financial resources and management time and effort without any assurance that product sales will result. The anticipated long sales cycle for some of our products makes it difficult to predict the quarter in which sales may occur. Delays in sales may cause us to expend resources without an acceptable financial return and make it difficult to plan expenses and forecast revenues.

Successful commercialization of our current and future products will require us to maintain a high level of technical expertise.

Technology in our target markets is undergoing rapid change. To succeed in our target markets, we will have to establish and maintain a leadership position in the technology supporting those markets. Accordingly, our success will depend on our ability to:

- Accurately predict the needs of our target customers and develop, in a timely manner, the technology required to support those needs;
- Provide products that are not only technologically sophisticated but are also available at a price acceptable to customers and competitive with comparable products;
- Establish and effectively defend our intellectual property; and
- Enter into relationships with other companies that have developed complementary technology into which our products may be integrated.

We cannot assure you that we will be able to achieve any of these objectives.

One of our significant target markets is the telecommunications market, which historically has not accepted polymer modulators.

One of our significant target markets is the telecommunications market, which demands high reliability optical components. Historically, polymer modulators have not been accepted into this market even though polymer modulators have achieved Telcordia™ based specifications. It is clear that the telecommunications market is demanding higher and higher data rates for its optical components, and may again decide that polymer based modulators are not suitable even if higher data rates, high reliability, and low power consumption are demonstrated.

Another of our significant target markets is the data communications (datacenter and/or high performance computing) market, which may be subject to heavy competition from other PIC based technologies such as silicon photonics and Indium Phosphide.

Another of our significant target markets is the fiber optic data communications market, in particular ultra-high bandwidth optical connections deployed inside and between datacenters and/or AI clusters, which may be subject to heavy competition from other PIC based technologies such as silicon photonics and Indium Phosphide. As the demands for high performance, low cost ($/Gbps) is implemented into next generation architectures, polymer modulators and polymer based PIC products may be subject to significant competition. Furthermore, there is a potential that technologies such as silicon photonics and Indium Phosphide might reach the metric of $1/Gbps at 800Gbps before ours. Customers may then be less willing to purchase new technology such as ours or invest in new technology development such as ours for next generation systems.

Our inability to successfully acquire and integrate other businesses, assets, products or technologies could harm our business and cause us to fail at achieving our anticipated growth.

We may grow our business through strategic acquisitions and investments, and we are actively evaluating acquisitions and strategic investments in businesses, products or technologies that we believe could complement or expand our product offering, create and/or expand a client base, enhance our technical capabilities or otherwise offer growth or cost-saving opportunities. From time to time, we may enter into letters of intent with companies with which we are negotiating potential acquisitions or investments or as to which we are conducting due diligence. Although we are currently not a party to any binding material definitive agreement with respect to potential investments in, or acquisitions of, complementary businesses, products or technologies, we may enter into these types of arrangements in the future, which could materially decrease the amount of our available cash or require us to seek additional equity or debt financing. We have limited experience in successfully acquiring and integrating businesses, products and technologies. We may not be successful in negotiating the terms of any potential acquisition, conducting thorough due diligence, financing the acquisition or effectively integrating the acquired business, product or technology into our existing business and operations. Our due diligence may fail to identify all of the problems, liabilities or other shortcomings or challenges of an acquired business, product or technology, including issues related to intellectual property, product quality or product architecture, regulatory compliance practices, revenue recognition or other accounting practices, or employee or customer issues.

Additionally, in connection with any acquisitions we complete, we may not achieve the synergies or other benefits we expected to achieve, and we may incur write-downs, impairment charges or unforeseen liabilities that could negatively affect our operating results or financial position or could otherwise harm our business. If we finance acquisitions using existing cash, the reduction of our available cash could cause us to face liquidity issues or cause other unanticipated problems in the future. If we finance acquisitions by issuing convertible debt or equity securities, the ownership interest of our existing stockholders may be diluted, which could adversely affect the market price of our stock. Further, contemplating or completing an acquisition and integrating an acquired business, product or technology could divert management and employee time and resources from other matters, which could harm our business, financial condition and operating results.

We may incur debt in the future that might be secured with our intellectual property as collateral, which could subject our Company to the risk of loss of all of our intellectual property.

We currently have no debt to service. If we incur debt in the future, we may be required to secure the debt with our intellectual property, including all of our patents and patents pending. In the event we default on the debt, we could incur the loss of all of our intellectual property, which would materially and adversely affect our Company and cause you to lose your entire investment in our Company.

Our failure to compete successfully could harm our business.

The markets that we are targeting for our proprietary electro-optic polymer systems and photonic devices are intensely competitive. Most of our present and potential competitors have or may have substantially greater research and product development capabilities, financial, scientific, marketing, manufacturing and human resources, name recognition and experience than we have. As a result, these competitors may:

- succeed in developing materials and product integration expertise that is equal to or superior to our offerings or that will achieve greater market acceptance than our offerings and future offerings;
- devote greater resources to developing, marketing or selling their products;
- respond more quickly to new or emerging technologies or scientific advances and changes in customer requirements, which could render our technologies obsolete;
- introduce products that make the continued development of our materials and future materials uneconomical;
- obtain patents that block or otherwise inhibit our ability to develop and commercialize our materials and future materials;
- withstand price competition more successfully than we can;
- establish cooperative relationships among themselves or with third parties that enhance their ability to address the needs of our prospective customers.

Our failure to compete successfully against these existing or future competitors could harm our business.

We may be unable to obtain effective intellectual property protection for our products and technology.

Our intellectual property, or any intellectual property that we have or may acquire, license or develop in the future, may not provide meaningful competitive advantages. Our patents and patent applications, including those we license, may be challenged by competitors, and the rights granted under such patents or patent applications may not provide meaningful proprietary protection. For example, numerous patents held by third parties relate to polymer materials and electro-optic devices. These patents could be used as a basis to challenge the validity or limit the scope of our patents or patent applications. A successful challenge to the validity or limitation of the scope of our patents or patent applications could limit our ability to commercialize our polymer materials technology and, consequently, reduce our revenues.

Moreover, competitors may infringe our patents or those that we license, or successfully avoid these patents through design innovation. To combat infringement or unauthorized use, we may need to resort to litigation, which can be expensive and time-consuming and may not succeed in protecting our proprietary rights. In addition, in an infringement proceeding a court may decide that our patents or other intellectual property rights are not valid or are unenforceable, or may refuse to stop the other party from using the intellectual property at issue on the ground that it is non-infringing. Policing unauthorized use of our intellectual property is difficult and expensive, and we may not be able to, or have the resources to, prevent misappropriation of our proprietary rights, particularly in countries where the laws may not protect these rights as fully as the laws of the United States.

We also rely on the law of trade secrets to protect unpatented technology and know-how. We try to protect this technology and know-how by limiting access to those employees, contractors and strategic partners with a need to know this information and by entering into confidentiality agreements with these parties. Any of these parties could breach the agreements and disclose our trade secrets or confidential information to our competitors, or these competitors might learn of the information in other ways. Disclosure of any trade secret not protected by a patent could materially harm our business.

We may be subject to patent infringement claims, which could result in substantial costs and liability and prevent us from selling our products.

Third parties may claim that our products or related technologies infringe their patents. Any patent infringement claims brought against us may cause us to incur significant expenses, divert the attention of our management and key personnel from other business concerns and, if successfully asserted against us, require us to pay substantial damages. In addition, as a result of a patent infringement suit, we may be forced to stop or delay developing, manufacturing or selling products that are claimed to infringe a patent covering a third party's intellectual property unless that party grants us rights to use its intellectual property. We may be unable to obtain these rights on terms acceptable to us, if at all. Even if we are able to obtain rights to a third party's patented intellectual property, these rights may be non-exclusive, and therefore our competitors may obtain access to the same intellectual property. Ultimately, we may be unable to sell our products or may have to cease some of our business operations as a result of patent infringement claims, which could severely harm our business.

If our products infringe the intellectual property rights of others, we may be required to indemnify customers for any damages they suffer. Third parties may assert infringement claims against our current or potential customers. These claims may require us to initiate or defend protracted and costly litigation on behalf of customers, regardless of the merits of these claims. If any of these claims succeed, we may be forced to pay damages on behalf of these customers or may be required to obtain licenses for the products they use. If we cannot obtain all necessary licenses on commercially reasonable terms, we may be unable to continue selling such products.

Our technology may be subject to government rights.

We may have obligations to government agencies in connection with the technology that we have developed, including the right to require that a compulsory license be granted to one or more third parties selected by certain government agencies. It may be difficult to monitor whether these third parties will limit their use of our technology to these licensed uses, and we could incur substantial expenses to enforce our rights to our licensed technology in the event of misuse.

The loss of certain of our key personnel, or any inability to attract and retain additional personnel, could impair our ability to attain our business objectives.

Our future success depends to a significant extent on the continued service of our key management personnel, particularly Yves LeMaitre, our Chief Executive Officer, Thomas E. Zelibor, our President and James S. Marcelli our Chief Financial Officer, Chief Operating Officer, and Secretary. Accordingly, the loss of the services of any of these persons would adversely affect our business and our ability to continue to commercialize our products, and impede the attainment of our business objectives.

Our future success will also depend on our ability to attract, retain and motivate highly skilled personnel to assist us with product development and commercialization. Competition for highly educated qualified personnel in the polymer industry is intense. If we fail to hire and retain a sufficient number of qualified management, engineering, sales and technical personnel, we will not be able to attain our business objectives.

If we fail to develop and maintain the quality of our manufacturing integration and design processes, our operating results would be harmed.

The manufacture and integration of our materials for devices is a multi-stage process that requires the use of high-quality materials and advanced manufacturing technologies and design. Also, polymer-related device development and manufacturing, whether performed by a silicon photonics design house or elsewhere, must occur in a highly controlled, clean environment to minimize particles and other yield and quality-limiting contaminants. In spite of stringent quality controls, weaknesses in process control or minute impurities in materials may cause a substantial percentage of a product in a lot to be defective. If we are not able to develop and continue to improve our manufacturing design processes, if stringent quality controls are not maintained, or if contamination problems arise, our operating results would be harmed.

The complexity of our organic nonlinear optical materials may lead to errors, defects and bugs, which could result in the necessity to redesign materials and could negatively impact our reputation with customers.

Organic nonlinear optical materials as complex as those we market and intend to market might contain errors, defects and bugs when first introduced or as new versions are released. Delivery and integration of materials with production defects or reliability, quality or compatibility problems could significantly delay or hinder market acceptance of our materials or result in a costly recall and could damage our reputation and adversely affect our ability to sell our materials. If our organic nonlinear optical materials experience defects, we may need to undertake a redevelopment of the materials, a process that may result in significant additional expenses.

We may also be required to make significant expenditures of capital and resources to resolve such problems. There is no assurance that problems will not be found in new products after commencement of commercial production, despite testing by our suppliers, our customers and us.

If we decide to make commercial quantities of products at our facilities, we will be required to make significant capital expenditures to increase capacity.

We lack the internal ability to manufacture products at a level beyond the stage of early commercial introduction. To the extent we do not have an outside vendor to manufacture our products, we will have to increase our internal production capacity and we will be required to expand our existing facilities or to lease new facilities or to acquire entities with additional production capacities. These activities would require us to make significant capital investments and may require us to seek additional equity or debt financing. We cannot assure you that such financing would be available to us when needed on acceptable terms, or at all. Further, we cannot assure you that any increased demand for our products would continue for a sufficient period of time to recoup our capital investments associated with increasing our internal production capacity.

In addition, we do not have experience manufacturing our products in large quantities. In the event of significant demand for our products, large-scale production might prove more difficult or costly than we anticipate and lead to quality control issues and production delays.

We may not be able to manufacture products at competitive prices.

To date, we have produced limited quantities of materials for license and sale and materials and devices for research, development, demonstration and prototype purposes. The cost per unit for these products currently exceeds the price at which we could expect to profitably sell them. If we cannot substantially lower our cost of production as we move into sales of products in significant commercial quantities, our financial results will be harmed.

We may be unable to export our products or technology to other countries, convey information about our technology to citizens of other countries or sell certain products commercially, if the products or technology are subject to United States export or other regulations.

We develop certain polymer-based products that we believe the United States government and other governments may be interested in using for military and information gathering or antiterrorism activities. United States government export regulations may restrict us from selling or exporting certain products into other countries, exporting our technology to those countries, conveying information about our technology to citizens of other countries or selling certain products to commercial customers. We may be unable to obtain export licenses for products or technology, if they become necessary. We currently cannot assess whether national security concerns would affect our future products and, if so, what procedures and policies we would have to adopt to comply with applicable existing or future regulations.

We are subject to regulatory compliance related to our operations.

We are subject to various U.S. governmental regulations related to occupational safety and health, labor and business practices. Failure to comply with current or future regulations could result in the imposition of substantial fines, suspension of production, alterations of our production processes, cessation of operations, or other actions, which could harm our business.

We may incur liability arising from the use of hazardous materials.

Our business and our facilities are subject to a number of federal, state and local laws and regulations relating to the generation, handling, treatment, storage and disposal of certain toxic or hazardous materials and waste products that we use or generate in our operations. Many of these environmental laws and regulations subject current or previous owners or occupiers of land to liability for the costs of investigation, removal or remediation of hazardous materials. In addition, these laws and regulations typically impose liability regardless of whether the owner or occupier knew of, or was responsible for, the presence of any hazardous materials and regardless of whether the actions that led to the presence were taken in compliance with the law. In our business, we use hazardous materials that are stored on site. We use various chemicals in our manufacturing process that may be toxic and covered by various environmental controls. An unaffiliated waste hauler transports the waste created by use of these materials off-site. Many environmental laws and regulations require generators of waste to take remedial actions at an off-site disposal location even if the disposal was conducted lawfully. The requirements of these laws and regulations are complex, change frequently and could become more stringent in the future. Failure to comply with current or future environmental laws and regulations could result in the imposition of substantial fines, suspension of production, alteration of our production processes, cessation of operations or other actions, which could severely harm our business.

Our data and information systems and network infrastructure may be subject to hacking or other cybersecurity threats. If our security measures are breached and an unauthorized party obtains access to our proprietary business information, our information systems may be perceived as being unsecure, which could harm our business and reputation, and our proprietary business information could be misappropriated which could have an adverse effect on our business and results of operations.

Our Company stores and transmits its proprietary information on its computer systems. Despite our security measures, our information systems and network infrastructure may be vulnerable to cyber-attacks or could be breached due to an employee error or other disruption that could result in unauthorized disclosure of sensitive information that has the potential to significantly interfere with our business operations. Breaches of our security measures could expose us to a risk of loss or misuse of this information, litigation and potential liability. Since techniques used to obtain unauthorized access or to sabotage information systems change frequently and generally are not recognized until launched against a target, we may be unable to anticipate these techniques or to implement adequate preventive measures in advance of such an attack on our systems. In addition, we use third party vendors to store our proprietary information who use cyber or "Cloud" storage of information as part of their service or product offerings, and despite our attempts to validate the security of such services, our proprietary information may be misappropriated by other parties. In the event of an actual or perceived breach of our security, or the security of one of our vendors, the market perception of the effectiveness of our security measures could be harmed and we could suffer damage to our reputation or our business. Additionally, misappropriation of our proprietary business information could prove competitively harmful to our business.

We conduct significantly all of our research and development activities at our Englewood, CO facility, and circumstances beyond our control may result in considerable business interruptions.

We conduct significantly all of our research and development activities at our Englewood, CO facility. Our operations are vulnerable to interruption by fire, earthquake, floods or other natural disaster, quarantines or other disruptions associated with infectious diseases, national catastrophe, terrorist activities, war, disruptions in our computing and communications infrastructure due to power loss, telecommunications failure, human error, physical or electronic security breaches and computer viruses, and other events beyond our control. We do not have a detailed disaster recovery plan.

We could be negatively affected as a result of a proxy contest and the actions of activist stockholders.

A proxy contest with respect to election of our directors, or other activist stockholder activities, could adversely affect our business because: (1) responding to a proxy contest and other actions by activist stockholders can be costly and time-consuming, disruptive to our operations and divert the attention of management and our employees; (2) perceived uncertainties as to our future direction caused by activist activities may result in the loss of potential business opportunities, and may make it more difficult to attract and retain qualified personnel and business partners; and (3) if individuals are elected to our Board of Directors with a specific agenda, it may adversely affect our ability to effectively and timely implement our strategic plans.

The requirements of being a public company are a strain on our systems and resources, are a diversion to management's attention and are costly.

As a public company, we are subject to the reporting requirements of the Securities Exchange Act of 1934 ("**Exchange Act**") the Sarbanes-Oxley Act of 2002 ("**Sarbanes-Oxley Act**"), the Dodd-Frank Wall Street Reform and Consumer Protection Act ("**Dodd-Frank Act**"), and the rules and regulations of The NASDAQ Stock Market. The requirements of these rules and regulations increase our legal, accounting and financial compliance costs, make some activities more difficult, time-consuming and costly and may also place undue strain on our personnel, systems and resources.

The Exchange Act requires, among other things, that we file annual, quarterly and current reports with respect to our business and operating results. The Sarbanes-Oxley Act requires, among other things, that we maintain effective disclosure controls and procedures and internal control over financial reporting. We are continuing the costly process of implementing and testing our systems to report our results as a public company, to continue to manage our growth and to implement internal controls. We are and will continue to be required to implement and maintain various other control and business systems related to our equity, finance, treasury, information technology, other recordkeeping systems and other operations. As a result of this implementation and maintenance, management's attention may be diverted from other business concerns, which could adversely affect our business. Furthermore, we rely on third-party software and system providers for ensuring our reporting obligations and effective internal controls, and to the extent these third parties fail to provide adequate service including as a result of any inability to scale to handle our growth and the imposition of these increased reporting and internal controls and procedures, we could incur material costs for upgrading or switching systems and our business could be materially affected.

In addition, changing laws, regulations and standards relating to corporate governance and public disclosure are creating uncertainty for public companies, increasing legal and financial compliance costs and making some activities more time consuming. These laws, regulations and standards are subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices. We intend to invest resources to comply with evolving laws, regulations and standards, and this investment may result in increased general and administrative expenses and a diversion of management's time and attention from revenue-generating activities to compliance activities. If our efforts to comply with new laws, regulations and standards differ from the activities intended by regulatory or governing bodies due to ambiguities related to their application and practice, regulatory authorities may initiate legal proceedings against us and our business may be adversely affected.

In addition, we expect these laws, rules and regulations to make it more difficult and more expensive for us to obtain director and officer liability insurance, and we may be required to incur substantial costs to maintain appropriate levels of coverage. These factors could also make it more difficult for us to attract and retain qualified members of our board of directors, particularly to serve on our audit committee, and qualified executive officers.

As a result of being a public company, our business and financial condition are more visible, which we believe may result in threatened or actual litigation, including by competitors and other third parties. If such claims are successful, our business and operating results could be adversely affected, and even if the claims do not result in litigation or are resolved in our favor, these claims, and the time and resources necessary to resolve them, could divert the time and resources of our management and adversely affect our business and operating results.

If we fail to maintain an effective system of disclosure controls and internal control over financial reporting, our ability to produce timely and accurate financial statements or comply with applicable regulations could be impaired.

As a public company, we are subject to the reporting requirements of the Securities Exchange Act of 1934 (Exchange Act) the Sarbanes-Oxley Act of 2002 (Sarbanes-Oxley Act), the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act), and the rules and regulations of The NASDAQ Stock Market. We expect that compliance with these rules and regulations will continue to increase our legal, accounting and financial compliance costs, make some activities more difficult, time-consuming and costly, and place significant strain on our personnel, systems and resources.

The Sarbanes-Oxley Act requires, among other things, that we assess the effectiveness of our internal control over financial reporting annually and the effectiveness of our disclosure controls and procedures quarterly. In particular, Section 404 of the Sarbanes-Oxley Act, (Section 404), requires us to perform system and process evaluation and testing of our internal control over financial reporting to allow management to report on, and our independent registered public accounting firm to attest to, the effectiveness of our internal control over financial reporting. Our compliance with applicable provisions of Section 404 requires that we incur substantial accounting expense and expend significant management time on compliance-related issues as we implement additional corporate governance practices and comply with reporting requirements. Moreover, if we are not able to comply with the requirements of Section 404 applicable to us in a timely manner, or if we or our independent registered public accounting firm identifies deficiencies in our internal control over financial reporting that are deemed to be material weaknesses, the market price of our stock could decline and we could be subject to sanctions or investigations by the SEC or other regulatory authorities, stockholder or other third-party litigation, all of which would require additional financial and management resources.

Furthermore, investor perceptions of our Company may suffer if deficiencies are found, and this could cause a decline in the market price of our stock or hinder our ability to raise capital. Irrespective of compliance with Section 404, any failure of our internal control over financial reporting could have a material adverse effect on our stated operating results and harm our reputation. If we are unable to continue to implement and maintain these requirements effectively or efficiently, it could harm our operations, financial reporting, or financial results and could result in an adverse opinion on our internal controls from our independent registered public accounting firm.

The exercise of options and warrants and other issuances of shares of common stock or securities convertible into common stock will dilute your interest.

Our Board may determine from time to time that it needs to raise additional capital by issuing additional shares of our common stock or other securities and we are not restricted from issuing additional common stock, including securities that are convertible into or exchangeable for, or that represent the right to receive, shares of our common stock. Because our decision to issue securities in any future offering will depend on market conditions and other factors beyond our control, we cannot predict or estimate the amount, timing, or nature of any future offerings, or the prices at which such offerings may be affected. Additional equity offerings may dilute the holdings of existing stockholders or reduce the market price of our common stock.

As of December 31, 2024, we have outstanding options and warrants to purchase an aggregate of 8,848,908 shares of our common stock at exercise prices ranging from $0.51 to 16.81 per share with a weighted average exercise price of $3.00 per share. The exercise of options and warrants at prices below the market price of our common stock could adversely affect the price of shares of our common stock. Additional dilution may result from the issuance of shares of our capital stock in connection with any collaboration (although none are contemplated at this time) or in connection with other financing efforts, including pursuant to the 2025 Purchase Agreement with Lincoln Park, and the Roth Sales Agreement with Roth Capital. Any issuance of our common stock that is not made solely to then-existing stockholders proportionate to their interests, such as in the case of a stock dividend or stock split, will result in dilution to each stockholder by reducing his, her or its percentage ownership of the total outstanding shares. Moreover, if we issue options or warrants to purchase our common stock in the future and those options or warrants are exercised or we issue restricted stock, stockholders may experience further dilution. Holders of shares of our common stock have no preemptive rights that entitle them to purchase their pro rata share of any offering of shares of any class or series.

The trading price of our common stock has been, and may continue to be, volatile, and the value of our common stock may decline. This volatility, as well as general market conditions, may cause our stock price to fluctuate greatly and even potentially expose us to litigation.

Our common stock may be subject to continued volatility. During the past 52 weeks, the share price for our common stock ranged from a low of $1.00 to a high of $4.82. We cannot assure you that the market price for our common stock will be less volatile or will remain at its current level. A decrease in the market price for our shares could result in substantial losses for investors. The market price of our common stock may be significantly affected by one or more of the following factors, many of which are beyond our control, including:

- our Company's ability to execute on its business plan;
- the status of particular development programs and the timing of performance under specific development agreements;
- actual or anticipated demand for our products and future products and technologies;
- amount and timing of our costs related to our development and marketing efforts or other initiatives and expansion of our operations;
- changes in anticipated commercial deployment of certain products and financial results;
- our ability to enter into, renegotiate or renew key agreements or strategic relationships;
- our ability to develop expanded product production facilities, along with silicon-based foundry and other outside contractor relationships;
- issuance of new or updated research or reports by securities analysts;
- the use by investors or analysts of third-party data regarding our business that may not reflect our operations;
- fluctuations in the valuation of companies perceived by investors to be comparable to us;
- share price and volume fluctuations attributable to inconsistent trading volume levels of our shares;
- large trades, block trades or short selling of our common stock;
- actual or anticipated changes in our competitive position relative to our industry competitors;
- announcements or implementation by our competitors of technological innovations or new products;
- changes in laws or regulations applicable to our products or industry;
- additions or departures of key personnel;
- capital-raising activities or commitments;
- product shortages requiring suppliers to allocate minimum quantities;
- the commencement or conclusion of legal proceedings that involve us;
- costs related to possible future acquisitions of technologies or businesses;
- economic conditions specific to our industry, as well as general economic and market conditions; or
- other events or factors, including those resulting from civil unrest, war, foreign invasions, terrorism, or public health crises or responses to such events.

Furthermore, the stock markets frequently experience extreme price and volume fluctuations that affect the market prices of equity securities of many companies. These fluctuations often have been unrelated or disproportionate to the operating performance of those companies. These broad market and industry fluctuations, as well as general economic, political, and market conditions such as recessions, elections, interest rate changes, or international currency fluctuations, may negatively impact the market price of our common stock. As a result of such fluctuations, you may not realize any return on your investment in us and may lose some or all of your investment. In the past, companies that have experienced volatility in the market price of their stock have been subject to securities class action litigation or derivative litigation.

A sale of a substantial number of shares of our common stock may cause the price of our common stock to decline and may impair our ability to raise capital in the future.

Our common stock is traded on The NASDAQ Capital Market and, despite certain increases of trading volume from time to time, there have been periods when the market for our common stock could be considered "thinly-traded," meaning that the number of persons interested in purchasing our common stock at or near bid prices at any given time may be relatively small. Finance transactions or option/warrant exercises resulting in a large amount of newly issued shares that become readily tradable, or other events that cause current stockholders to sell shares, could place downward pressure on the trading price of our stock the trading price of our stock could decline. Additionally, we believe a significant portion of our shares are held by shareholders that accumulated their shares during a time when our shares prices were significantly less than our current share prices. If these shareholders, some of which hold a substantial number of shares of our common stock, decide to sell some or all of their shares at once without regard to the impact of their sales on the market price of our stock, the trading price of our stock could decline. In addition, the lack of a robust resale market may require a stockholder who desires to sell a large number of shares of common stock to sell the shares in increments over time to mitigate any adverse impact of the sales on the market price of our stock.

If our existing stockholders sell, or the market perceives that our stockholders intend to sell, substantial amounts of our common stock in the public market, including shares issued upon the exercise of outstanding options or warrants or pursuant to the 2025 Purchase Agreement with Lincoln Park, and the Roth Sales Agreement with Roth Capital, the market price of our common stock could decline. Sales of a substantial number of shares of our common stock may make it more difficult for us to sell equity or equity-related securities in the future at a time and price that we deem reasonable or appropriate. We may become involved in securities class action litigation that could divert management's attention and harm our business.

Our common stock will be subject to potential delisting if we do not maintain the listing requirements of the Nasdaq Capital Market.

Our common stock commenced trading on The NASDAQ Capital Market on September 1, 2021. We cannot assure you that an active trading market for our common stock will continue to be sustained. Nasdaq has rules for continued listing, including, without limitation, minimum market capitalization and other requirements. Failure to maintain our listing, or de-listing from Nasdaq, would make it more difficult for stockholders to dispose of our securities and more difficult to obtain accurate price quotations on our securities. This could have an adverse effect on the price of our common stock. Our ability to issue additional securities for financing or other purposes, or otherwise to arrange for any financing we may need in the future, may also be materially and adversely affected if our common stock and/or other securities are not traded on a national securities exchange.

If securities or industry analysts do not publish research or reports about our business, or if they change their recommendations regarding our stock adversely, our stock price and trading volume could decline.

The trading market for most listed companies' securities depends in part on the research and reports that securities or industry analysts publish about them or their business. We currently have no independent research analysts that cover our stock and we may not obtain research coverage by securities and industry analysts until our products are commercialized and we obtain revenues, and there is no assurances that we will ever obtain independent research analysts coverage. If no securities or industry analysts commence coverage of us, the trading price for our common stock could be negatively affected. In the event any analyst who covers us downgrades our securities, the price of our securities would likely decline. If one or more of these analysts ceases to cover us or fails to publish regular reports on us, interest in the purchase of our securities could decrease, which could cause the price of our common stock and its trading volume to decline.

Our board of directors has the authority, without stockholder approval, to issue preferred stock with terms that may not be beneficial to existing common stockholders and with the ability to affect adversely stockholder voting power and perpetuate their control over us.

Our articles of incorporation, as amended, allow us to issue shares of preferred stock without any vote or further action by our stockholders. Our board of directors has the authority to fix and determine the relative rights and preferences of preferred stock. Our board of directors also has the authority to issue preferred stock without further stockholder approval, including large blocks of preferred stock. As a result, our board of directors could authorize the issuance of a series of preferred stock that would grant to holders thereof the preferred right to our assets upon liquidation, the right to receive dividend payments before dividends are distributed to the holders of common stock or other preferred stockholders and the right to the redemption of the shares, together with a premium, prior to the redemption of our common stock or existing preferred stock, if any.

Preferred stock could be used to dilute a potential hostile acquirer. Accordingly, any future issuance of preferred stock or any rights to purchase preferred stock may have the effect of making it more difficult for a third party to acquire control of us. This may delay, defer or prevent a change of control or an unsolicited acquisition proposal. The issuance of preferred stock also could decrease the amount of earnings attributable to, and assets available for distribution to, the holders of our common stock and could adversely affect the rights and powers, including voting rights, of the holders of our common stock and preferred stock.

Our articles of incorporation and amended and restated bylaws, and certain provisions of Nevada corporate law, as well as certain of our contracts, contain provisions that could delay or prevent a change in control even if the change in control would be beneficial to our stockholders.

Nevada law, as well as our articles of incorporation, as amended, and amended and restated bylaws, contain anti-takeover provisions that could delay or prevent a change in control of our Company, even if the change in control would be beneficial to our stockholders. These provisions could lower the price that future investors might be willing to pay for shares of our common stock. These anti-takeover provisions:

- authorize our board of directors to create and issue, without stockholder approval, preferred stock, thereby increasing the number of outstanding shares, which can deter or prevent a takeover attempt;
- prohibit cumulative voting in the election of directors, which would otherwise allow less than a majority of stockholders to elect director candidates;
- empower our board of directors to fill any vacancy on our board of directors, whether such vacancy occurs as a result of an increase in the number of directors or otherwise;
- provide that our board of directors be divided into three classes, with approximately one-third of the directors to be elected each year;
- provide that special meetings of our stockholders may only be called by the chairperson, president or chief executive officer, or by resolution of the board of directors or at the request in writing of stockholders owning 66 2/3% in amount of the entire capital stock of the Company issued and outstanding and entitled to vote;
- establish advance notice procedures with regard to stockholder proposals relating to stockholder nominees for director and other stockholder proposals;
- provide that our board of directors is expressly authorized to adopt, amend or repeal our bylaws; and
- provide that our directors will be elected by a plurality of the votes cast in the election of directors.

Nevada Revised Statutes, the terms of our employee stock option agreements and other contractual provisions may also discourage, delay or prevent a change in control of our Company. Nevada Revised Statutes sections 78.378 to 78.3793 provide state regulation over the acquisition of a controlling interest in certain Nevada corporations unless the articles of incorporation or bylaws of the corporation provide that the provisions of these sections do not apply. Our articles of incorporation, as amended, and amended and restated bylaws do not state that these provisions do not apply. The statute creates a number of restrictions on the ability of a person or entity to acquire control of a Nevada company by setting down certain rules of conduct and voting restrictions in any acquisition attempt, among other things. The statute contains certain limitations and it may not apply to our Company. Our 2016 Equity Incentive Plan includes change-in-control provisions that allow us to grant options that may become vested immediately upon a change in control. Our board of directors also has the power to adopt a stockholder rights plan that could delay or prevent a change in control of our Company even if the change in control is generally beneficial to our stockholders. These plans, sometimes called “poison pills,” are oftentimes criticized by institutional investors or their advisors and could affect our rating by such investors or advisors. If our board of directors adopts such a plan, it might have the effect of reducing the price that new investors are willing to pay for shares of our common stock.

Together, these charter, statutory and contractual provisions could make the removal of our management and directors more difficult and may discourage transactions that otherwise could involve payment of a premium over prevailing market prices for our common stock. Furthermore, the existence of the foregoing provisions, as well as the significant common stock beneficially owned by our founders, executive officers, and members of our board of directors, could limit the price that investors might be willing to pay in the future for shares of our common stock. They could also deter potential acquirers of our Company, thereby reducing the likelihood that you could receive a premium for your common stock in an acquisition.

Item 1B. Unresolved Staff Comments.

None.

Item 1C. Cybersecurity.

Cybersecurity Risk Management and Strategy. We depend on software applications, information technology systems, computing infrastructure and cloud service providers to operate our business. Certain of these systems are managed, hosted, provided or used by third parties, to assist in conducting our business and which have their own cyber security measures in place. We implement generally applicable industry standards and best practices processes for the assessment, identification, and management of material risks from cybersecurity threats to our information technology systems. We have an Information Security Coordinator who oversees our information security policies and procedures. Our Information Security Coordinator maintains a cyber incident reporting and response process and provides management notifications based on the seriousness of any incident. Our information security policies and procedures are required to be reviewed on a regular basis.

We have not experienced a cybersecurity incident that resulted in a material adverse impact to our business or operations; however, there can be no guarantee that we will not experience such an incident in the future. For a description of the risks from cybersecurity threats that may materially affect our Company and how they may do so, please see “Risk Factors” included in Part I, Item 1A of this Annual Report on Form 10-K, including “Our data and information systems and network infrastructure may be subject to hacking or other cyber security threats. If our security measures are breached and an unauthorized party obtains access to our proprietary business information, our information systems may be perceived as being unsecure, which could harm our business and reputation, and our proprietary business information could be misappropriated which could have an adverse effect on our business and results of operations."

Cybersecurity Governance. Our Audit Committee has primary responsibility for overseeing our risk-management program relating to cybersecurity, although our Board of Directors participates in periodic reviews and discussion dedicated to cyber risks, threats, and protections.

Item 2. Properties.

Our principal executive office and research and development facility is located at 369 Inverness Parkway, Suite 350, Englewood, Colorado. The 23,104 square feet facility includes fully functional 1,000 square feet of class 1,000 cleanroom, 500 square feet of class 10,000 cleanroom, chemistry laboratories, and analytic laboratories, and serves as our office, laboratory and research and development space. Our total annual base rent during 2024 is expected to be approximately $387,666.

Item 3. Legal Proceedings.

We are not a party to any litigation of a material nature, nor are we aware of any threatened litigation of a material nature.

Item 4. Mine Safety Disclosures.

Not Applicable.

PART II

Item 5. Market For Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases Of Equity Securities.

Market Information

Our common stock trades on the Nasdaq Capital Market under the symbol LWLG.

Holders of Common Stock

On March 18, 2025, we had approximately 67 holders of our common stock, not including persons who hold our common stock in nominee or "street name" accounts through brokers or banks.

Dividend Policy

Our Company has never paid a cash dividend and has no present plans to pay cash dividends.

Securities Authorized for Issuance under Equity Compensation Plans

Equity Compensation Plans as of December 31, 2024.

Equity Compensation Plan Information

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted-average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders[1]	9,499,859	$3.17	3,480,845
Equity compensation plans not approved by security holders [2]	400,000	$0.60	—
Total	9,899,859	$3.07	3,480,845

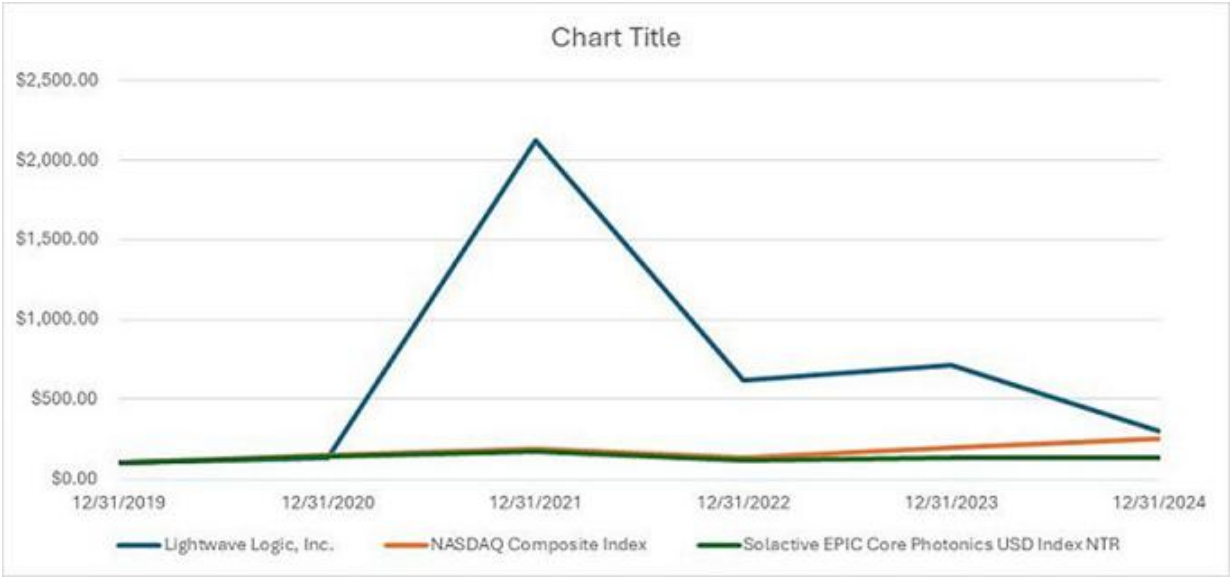
1. Reflects shares of common stock to be issued pursuant to our 2016 Equity Incentive Plan and our 2007 Employee Stock Plan, both of which are for the benefit of our directors, officers, employees and consultants. We have reserved 13,000,000 shares of common stock for such persons pursuant to our 2016 Equity Incentive Plan. We terminated our 2007 Employee Stock Plan in June 2016 and no additional awards are made under that plan.

2. Comprised of common stock purchase warrants we issued for services.

Stock Performance Graph

The graph set forth below compares the cumulative total stockholder return on our common stock between December 31, 2019 and December 31, 2024, with the cumulative total return of (a) the NASDAQ Composite Index and (b) Solactive EPIC Core Photonics USD Index NTR, over the same period. This graph assumes the investment of $100 on December 31, 2019 in our common stock, the NASDAQ Composite Index and the Solactive EPIC Core Photonics USD Index NTR and assumes the reinvestment of dividends, if any. The graph assumes our closing sales price on December 31, 2019 of $0.70 per share as the initial value of our common stock.

The comparisons shown in the graph below are based upon historical data. The stock price performance shown in the graph below is not necessarily indicative of, nor is it intended to forecast, the potential future performance of our common stock. Information used in the graph was obtained from the NASDAQ Stock Market LLC and Solactive AG, financial data providers and sources believed to be reliable.



The above graph and related information shall not be deemed "soliciting material" or to be "filed" with the Securities and Exchange Commission, nor shall such information be incorporated by reference into any future filing under the Securities Act or the Exchange Act except to the extent we specifically incorporate it by reference into such filing. Our stock price performance shown in the graph below is not indicative of future stock price performance.

Recent Sales of Unregistered Securities

During the period covered by this report, our Company has sold the following securities without registering the securities under the Securities Act:

Date	Security
January 2024	Common Stock — 19,000 shares of Common Stock at $0.75 per share pursuant to a warrant exercise.
December 2024	Common Stock — 100,000 shares of Common Stock at $0.77 per share pursuant to a warrant exercise.

No underwriters were utilized, and no commissions or fees were paid with respect to any of the above transactions. These persons were the only offerees in connection with these transactions. We relied on Section 4(a)(2) and Rule 506 of Regulation D of the Securities Act since the transaction does not involve any public offering.

Purchases of Equity Securities by the Issuer or Affiliated Purchasers

None.

Item 6. RESERVED.

Item 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS.

The following management's discussion and analysis of financial condition and results of operations provides information that management believes is relevant to an assessment and understanding of our plans and financial condition. The following selected financial information is derived from our historical financial statements and should be read in conjunction with such financial statements and notes thereto set forth elsewhere within this Annual Report on Form 10-K and the "Forward-Looking Statements" explanation included elsewhere herein.

Overview

Lightwave Logic, Inc. is a technology platform company leveraging its proprietary engineered electro-optic (EO) polymers to transmit data at higher speeds with less power in a small form factor. The Company's high activity and high stability organic polymers allow it to create next-generation photonic EO devices that convert data from electrical signals into light/optical signals for applications in telecommunications, and for data transmission potentially used to support generative AI.

Our differentiation at the modulator device level is in higher speed, lower power consumption, simplicity of manufacturing, small footprint (size), and reliability. We have demonstrated the electro-optic polymers potential for higher speed and lower power consumption in packaged devices, and during 2024, we continued to make advances in techniques to translate our world class material properties to efficient, reliable modulator devices with commercial foundries. We are currently focused on a) working with potential and existing customers to integrate our proprietary materials into our customers' specific PIC and device architecture. b) testing and demonstrating the superior performance, simplicity of manufacturability and reliability of our devices, including in conjunction with the silicon photonics manufacturing ecosystem c) providing our potential and existing customers with the proper Process Development Kits (PDKs) to enable the efficient and fast integration of our materials into their own design and manufacturing plans. In 2024 we continued to work with silicon-based foundry partners to help scale in volume our polymer modulator devices and we received working modulator chips from these foundries. We have advanced and matured our interactions with our foundry partners and we continue to receive working modulator chips for prototyping. Silicon-based foundries are semiconductor fabrication plants developed for the electronics IC business, that are now engaging with silicon photonics to increase their wafer throughput. Partnering with silicon-based foundries not only demonstrates that our polymer technology can be transferred into standard production lines using standard equipment, it also allows us to efficiently utilize our capital. The foundry partnerships will allow us to scale our high-performance polymer optical engines quickly and efficiently. We have now received silicon wafers that range up to 200mm in diameter, which aligns well with foundry manufacturing.

Our extremely strong and broad patent portfolio allows us to optimize our business model in three areas: 1) Traditional focus on polymer materials development, 2) Patent licensing and 3) Technology transfer to foundries. We are continually looking to strengthen our patent portfolio both by internal inventions and acquisition of intellectual property.

We are initially targeting applications in fiber optic data communications and telecommunications markets, in particular ultra-high bandwidth optical connections deployed inside and between datacenters and/or AI clusters. In addition, we are exploring other applications that include automotive/LIDAR, sensing, displays, storage, aerospace and defense, etc., for our polymer technology platform. Our goal is to have our unique polymer technology platform become ubiquitous across multiple market verticals over and above the optical fiber optic communications markets.

Artificial Intelligence (AI) has been integrating deeper within our daily activities with applications to make us more efficient and possibly smarter. The impact on the internet is huge, and the internet is based on an optical network that utilizes data centers to route and switch traffic or information to and from destinations. Data centers are being upgraded today in a fashion that the industry has not seen before with significant investments of capital. The expected demands of increased traffic, information, and data driven by AI is changing the way the internet is being operated. AI is now creating new and interesting market opportunities to upgrade the internet. Three of these opportunities are important today: density, speed, and low power and these are very well aligned with our high performance electro-optic polymers modulator platform. We are designing high performance polymer modulator optical engines to support the rise and growth of AI as it generates more information that will travel through the internet and optical network. While we are not directly an AI company designing electronic processors, we do see immediate benefits of enabling higher levels of information to cross the internet using our optical polymer modulator platform.

Commencement of Commercial Operations

We commenced commercial operations in May 2023. Presently, our commercial operations consist of a material supply license agreement to provide Perkinamine® chromophore materials for polymer based photonic devices and photonic integrated circuits (PICs). The license agreement represents tangible commercial progress for electro-optic polymers as part of our Company's business plan. Our Company is also in various stages of photonic proprietary device designs and materials development and evaluation with potential customers and strategic partners. We expect to continue to obtain a revenue stream from technology licensing agreements, and to obtain additional revenue streams from technology transfer agreements and sale of our electro-optic proprietary device designs.

Business Strategy

Our first revenue stream was obtained from our entry into a material supply license agreement to provide Perkinamine® chromophore materials for polymer based photonic devices and photonic integrated circuits (PICs). Our Company is also in various stages of photonic device designs and materials development and evaluation with potential customers and strategic partners. We expect to continue to obtain a revenue stream from technology licensing agreements, and to obtain additional revenue streams from technology transfer agreements and sale of our proprietary electro-optic devices.

Specifically, our business strategy provides that our revenue stream will be derived from one or some combination of the following: (i) technology licensing for specific product application; (ii) joint venture relationships with significant industry leaders; and (iii) the sale of our own proprietary electro-optic device designs. Our objective is to be a leading provider of proprietary technology and know-how in the electro-optic materials and devices. In order to meet this objective, we intend to continue to:

- Further the development of proprietary organic electro-optic polymer material systems
- Develop photonic device designs based on our P^2IC™ technology
- Develop proprietary intellectual property
- Grow our device design development capabilities
- Partner with silicon-based foundries who can scale volume quickly
- Grow our product reliability and quality assurance capabilities
- Grow our optoelectronic packaging and testing capabilities
- Grow our commercial material manufacturing capabilities
- Maintain/develop strategic relationships with major telecommunications and data communications companies to further the awareness and commercialization of our technology platform
- Add high-level personnel with industrial and manufacturing experience in key areas of our materials and device development

Create Organic Polymesr-Enabling design and production of Electro-Optic Modulators

We intend to utilize our proprietary optical polymer technology to create an initial portfolio of commercial electro-optic polymer product devices designs with applications for various markets, including telecommunications, data communications and data centers. These product devices will be part of our proprietary photonics integrated circuit (PIC) technology platform.

Capital Requirements

We commenced commercial operations in May 2023, and we do not generate sufficient revenues to pay for our operating expenses. We have incurred substantial net losses since inception. We have satisfied our capital requirements since inception primarily through the issuance and sale of our common stock.

Results of Operations

Comparison of year ended December 31, 2024 to year ended December 31, 2023

Revenues

During the year ended December 31, 2024, we recognized $81,855 of licensing and royalty revenue and $13,750 of revenue for the device processing work on the device supplied by a customer. During the year ended December 31, 2023, we recognized $40,502 of licensing and royalty revenue.

Cost of sales

During the year ended December 31, 2024, we recognized $7,395 in cost of sales. During the year ended December 31, 2023, we recognized $2,513 in cost of sales.

Operating expenses

	For the Year Ended December 31, 2024	For the Year Ended December 31, 2023	Change from Prior Year	Percent Change from Prior Year
Research and development	16,806,548	$ 15,903,689	$ 902,859	6%
General and administrative	6,370,805	5,359,565	1,011,240	19%
	$ 23,177,353	$ 21,263,254	$ 1,914,099	9%

Research and development expenses increased for the year ended December 31, 2024, as compared to the year ended December 31, 2023, primarily due to increases in research and development salary and benefits expenses, research and development equipment depreciation expense, prototype device development and wafer fabrication expenses, research and development travel expenses, rent expenses, property tax expenses, research and development consulting expenses, software expenses, and laboratory and wafer fabrication materials and supplies expenses, offset by decreases in research and development non-cash stock option amortization expenses, research and development recruiting fees, and research and development employee relocation expenses in the year ended December 31, 2024, compared to the same period in 2023.

- Research and development salary and benefits expenses increased by $1,472,979 in the year ended December 31, 2024, compared to the same period in 2023.
- Depreciation expense increased by $424,232 in the year ended December 31, 2024, compared to the same period in 2023.
- Prototype device development and wafer fabrication expenses increased by $341,555 in the year ended December 31, 2024, compared to the same period in 2023.
- Research and development travel expenses increased by $107,351 in the year ended December 31, 2024, compared to the same period in 2023.
- Research and development rent expenses increased by $99,898 in the year ended December 31, 2024, compared to the same period in 2023.
- Property tax expenses increased by $98,181 in the year ended December 31, 2024, compared to the same period in 2023.
- Research and development consulting expenses increased by $65,261 in the year ended December 31, 2024, compared to the same period in 2023.
- Research and development software expenses increased by $64,318 in the year ended December 31, 2024, compared to the same period in 2023.
- Laboratory and wafer fabrication materials and supplies expenses increased by $59,090 in the year ended December 31, 2024, compared to the same period in 2023.
- These increases were offset by a $1,571,632 decrease in research and development non-cash stock option amortization expenses, a $216,115 decrease in research and development recruiting fees, and a $108,305 decrease in research and development employee relocation expenses in the year ended December 31, 2024, compared to the same period in 2023.

We expect to continue to incur substantial research and development expenses developing and commercializing our electro-optic materials platform. These expenses will increase as a result of accelerated development effort to support commercialization of our non-linear optical polymer materials technology and create next-generation photonic EO device designs; working with semiconductor foundries; hiring additional technical and support personnel; engaging senior technical advisors; pursuing other potential business opportunities and collaborations; customer testing and evaluation; and incurring related operating expenses.

General and administrative expenses increased for the year ended December 31, 2024, as compared to the year ended December 31, 2023, primarily due to increases in general and administrative salary and benefits expenses, consulting fees, depreciation expense, investor relations expenses, and sales and marketing expenses, offset by decreases general and administrative non-cash stock option amortization expenses, and accounting expenses.

- General and administrative salary and benefits expenses increased by $866,829 in the year ended December 31, 2024, compared to the same period in 2023.
- General and administrative consulting fees increased by $215,707 in the year ended December 31, 2024, compared to the same period in 2023.
- Depreciation expense increased by $103,624 in the year ended December 31, 2024, compared to the same period in 2023.
- Investor relations expenses increased by $54,259 in the year ended December 31, 2024, compared to the same period in 2023.
- Sales and marketing expenses increased by $52,623 in the year ended December 31, 2024, compared to the same period in 2023.
- These increases were offset by a $263,822 decrease in general and administrative non-cash stock option amortization expense and a $183,722 decrease in accounting fees in the year ended December 31, 2024, compared to the same period in 2023.

Other Income

	For the Year Ended December 31, 2024	For the Year Ended December 31, 2023	Change from Prior Year	Percent Change from Prior Year
Other Income	$ 554,102	$ 187,233	$ 366,869	196%

Other income increased for the year ended December 31, 2024, as compared to year ended December 31, 2023, primarily due to a $519,368 decrease in commitment fee associated with the purchase of shares by an institutional investor for sale under a stock purchase agreement, a $280,433 increase in interest income on money market account, and a recognition of a $210,274 loss on retirement of certain expired patent applications and patents.

Other income increased for the year ended December 31, 2023, as compared to the year ended December 31, 2022, primarily due to an increase in interest income earned on money market account of $568,137 and a gain on disposal of fixed assets of $215,509, offset by an increase in commitment fee associated with the purchase of shares by an institutional investor for sale under a stock purchase agreement in the amount of $463,869.

Net Loss

	For the Year Ended December 31, 2024	For the Year Ended December 31, 2023	Change from Prior Year	Percent Change from Prior Year
Net Loss	$ 22,535,041	$ 21,038,032	$ 1,497,009	7%

Net loss was $22,535,041 and $21,038,032 for the year ended December 31, 2024 and 2023, respectively, for an increase of $1,497,009 due primarily to increases in salary and benefits expenses, depreciation expense, prototype device development and wafer fabrication expenses, and consulting fees, recognition of loss on retirement of certain expired patent applications and patents, travel expenses, rent expense, property tax expenses, software expenses, laboratory and wafer fabrication materials and supplies expenses, investor relations expenses, and sales and marketing expenses. These increases were offset by decreases in non-cash stock option amortization expense, commitment fee associated with the purchase of shares by an institutional investor for sale under a stock purchase agreement, recruiting fees, accounting fees, and employee relocation expenses, and an increase in interest income on money market account.

Significant Accounting Policies

Our Company's accounting policies are more fully described in Note 1 of Notes to Financial Statements. As disclosed in Note 1 of Notes to Financial Statements, the preparation of financial statements in conformity with accounting principles generally accepted in the United States requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying disclosures. Although these estimates are based on our management's best knowledge of current events and actions our Company may undertake in the future, actual results could differ from the estimates.

Liquidity and Capital Resources

Our primary source of operating cash inflows was (i) proceeds from the sale of common stock to Lincoln Park (institutional investor) pursuant to purchase agreements with Lincoln Park and proceeds from sale of common stock by Roth Capital (investment banking company) pursuant to the at the market sale agreement with Roth Capital as described in Note 10 to the Financial Statements and (ii) proceeds received pursuant to the exercise of options and warrants.

On July 2, 2021, our Company filed a $100 million universal shelf registration statement which became effective on July 9, 2021, and expired on July 8, 2024. On July 26, 2024, the Company filed a new $100 million universal shelf registration statement which became effective on August 5, 2024. On October 4, 2021, our Company entered into the 2021 purchase agreement with Lincoln Park to sell up to $33 million of registered common stock over a 36-month period. All of the registered shares under the October 4, 2021 purchase agreement with Lincoln Park have been issued as of December 31, 2023. On February 28, 2023, our Company entered into the 2023 Purchase Agreement with Lincoln Park to sell up to $30 million of registered common stock over a 36-month period. As of the date of this filing, $0 remains on the 2023 Purchase Agreement. On March 17, 2025, our Company entered into the 2025 Purchase Agreement with Lincoln Park to sell up to $30 million of registered common stock over a 36-month period, subject to the conditions set forth therein. As of the date of this filing, $30 million remains on the 2025 Purchase Agreement. On December 9, 2022, our Company entered into the at the market sale agreement with Roth Capital, as sales agent, whereby pursuant to the at the market sale agreement, our Company may offer and sell up to $35 million in shares of our registered common stock, from time to time through Roth Capital. As of the date of this filing, $31.5 million remains available to our Company pursuant to the at the market sale agreement.

During the year ended December 31, 2024, the Company received $12,366,965 in proceeds pursuant to the 2023 Purchase Agreement with Lincoln Park, $1,779,976 in proceeds pursuant to the at the market sale agreement with Roth Capital, $337,350 in proceeds pursuant to the exercise of options and warrants and $63,884 in cash collections from customer contracts, of which $50,000 related to the proceeds received under a material supply and license agreement and $13,884 – to the proceeds received for a contact for processing work on the devices supplied by a customer. During the year ended December 31, 2023, the Company received $19,993,359 in proceeds pursuant to the 2021 purchase agreement and 2023 Purchase Agreement with Lincoln Park, $1,515,878 in proceeds pursuant to the at the market sale agreement with Roth Capital, $1,013,924 in proceeds pursuant to the exercise of options and warrants and $50,000 in a proceed received under a material supply and license agreement of which $39,875 is recorded as a contract liability as of December 31, 2023.

During the year ended December 31, 2024, our primary sources of cash outflows from operations included payroll, rent, utilities, payments to vendors including prototypes development and foundries expenses, laboratory and wafer fabrication materials and supplies expenses, and third-party service providers. During the year ended December 31, 2023, our primary sources of cash outflows from operations included payroll, rent, utilities, payments to vendors including prototypes development and foundries expenses and third-party service providers.

Sources and Uses of Cash

Our future expenditures and capital requirements will depend on numerous factors, including: the progress of our research and development efforts; the rate at which we can, directly or through arrangements with original equipment manufacturers, introduce and sell products incorporating our polymer materials technology; the costs of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights; market acceptance of our products and competing technological developments; and our ability to establish cooperative development, joint venture and licensing arrangements. We expect that we will incur approximately $1,727,000 of expenditures per month over the next 12 months.

We expect the proceeds received pursuant to the 2023 and the 2025 Lincoln Park purchase agreements and, the at the market sale agreement with Roth Capital, the exercise of options and warrants, and commercial operations to provide us with sufficient funds to maintain our operations over the next 12 months. Our current cash position enables us to finance our operations through April 2026 before we will be required to replenish our cash reserves. Our cash requirements are expected to increase at a rate consistent with our Company's revenue growth as we expand our activities and operations with the objective of increasing our revenue stream from the commercialization of our electro-optic polymer technology. We currently have no debt to service. We expect that our cash used in operations will continue to increase during 2025 and beyond because of the following planned activities:

- The addition of management, sales, marketing, technical and other staff to our workforce;
- Increased spending for the expansion of our research and development efforts, including purchases of additional laboratory and production equipment;
- Increased spending in marketing as our products are introduced into the marketplace;
- Partnering with commercial foundries to implement our electro-optic polymers into accepted PDKs by the foundries;
- Developing and maintaining collaborative relationships with strategic partners;
- Developing and improving our manufacturing processes and quality controls; and
- Increases in our general and administrative activities related to our operations as a reporting public company and related corporate compliance requirements.

2023 and 2025 Purchase Agreements with Lincoln Park

On February 28, 2023, our Company entered into the 2023 Purchase Agreement with Lincoln Park, pursuant to which Lincoln Park agreed to purchase from us up to $30 million of our common stock (subject to certain conditions) from time to time over a 36-month period. On March 17, 2025, our Company entered into the 2025 Purchase Agreement with Lincoln Park, pursuant to which Lincoln Park agreed to purchase from us up to $30 million of our common stock (subject to certain conditions) from time to time over a 36-month period. Pursuant to the 2025 Purchase Agreement, subject to the conditions set forth therein, Lincoln Park is obligated to make purchases as the Company directs in accordance with the 2025 Purchase Agreement, which may be terminated by the Company at any time, without cost or penalty. Sales of shares will be made in specified amounts and at prices that are based upon a look back formula for market prices of our common stock immediately preceding the sales to Lincoln Park.

There are no trading volume requirements or restrictions on the 2025 Purchase Agreement, and we will control the timing and amount of any sales of our common stock to Lincoln Park. Lincoln Park has no right to require any sales by us, but is obligated to make purchases from us as we direct in accordance with the 2025 Purchase Agreement. We can also accelerate the amount of common stock to be purchased under certain circumstances. There are no limitations on the use of proceeds, financial or business covenants, restrictions on future financings (other than restrictions on the Company's ability to enter into a similar type of agreement or equity line of credit during the term, excluding an at-the-market transaction with a registered broker-dealer), rights of first refusal, participation rights, penalties or liquidated damages in the 2025 Purchase Agreement.

At the Market Sale Agreement – Roth Capital

On December 9, 2022, we entered into the at the market sale agreement with Roth Capital, as sales agent. Pursuant to the at the market sale agreement, our Company may offer and sell up to $35 million in shares of our common stock, from time to time through Roth Capital. Upon delivery of a placement notice based on our Company's instructions and subject to the terms and conditions of the at the market sale agreement, Roth Capital may sell the shares by methods deemed to be an "at the market offering" as defined in Rule 415(a)(4) promulgated under the Securities Act, including sales made directly on or through The Nasdaq Capital Market, on any other existing trading market for the Company's common stock, in negotiated transactions at market prices prevailing at the time of sale or at prices related to such prevailing market prices, or by any other method permitted by law, including negotiated transactions, subject to the prior written consent of our Company. We are not obligated to make any sales of shares under this agreement. The Company or Roth Capital may suspend or terminate the offering of shares upon notice to the other party, subject to certain conditions. Roth Capital will act as sales agent on a commercially reasonable efforts basis consistent with its normal trading and sales practices and applicable state and federal law, rules and regulations and the rules of Nasdaq. We have agreed to pay Roth Capital commissions for its services of acting as agent of 3.0% of the gross proceeds from the sale of the shares pursuant to the at the market sale agreement.

The amount of proceeds we receive from the at the market sale agreement, if any, will depend upon the number of shares of our common stock sold and the market price at which they are sold. There can be no assurance that we will be able to sell any shares under or fully utilize this agreement. Roth Capital is not required to sell any specific number of shares of our common stock under the agreement. We intend to use net proceeds from the at the market sale agreement for general corporate purposes, including, without limitation, sales and marketing activities, product development, making acquisitions of assets, businesses, companies or securities, capital expenditures, and for working capital needs.

We cannot assure you that we will meet the conditions of the 2025 Purchase Agreement with Lincoln Park in order to obligate Lincoln Park to purchase our shares of common stock, and we cannot assure you that we will be able to sell any shares under or fully utilize the at the market sale agreement with Roth Capital. In the event we fail to do so, and other adequate funds are not available to satisfy long-term capital requirements, or if planned revenues are not generated, we may be required to substantially limit our operations, which could result in our Company reducing some capital expenditures or reducing staff and discretionary costs.

Analysis of Cash Flows

For the year ended December 31, 2024

Net cash used in operating activities was $15,550,515 for the year ended December 31, 2024, primarily attributable to the net loss of $22,535,041 adjusted by $4,440,003 in options issued for services, $446,628 amortization of deferred compensation, $154,210 in common stock issued for services, $1,682,760 in depreciation expenses and patent amortization expenses, $192,487 amortization of right of use asset, $213,440 loss on disposal of property and equipment and retirement of certain expired patent applications and patents, $(15,189) in accounts receivable, $835,880 in prepaid expenses and other current assets, and ($965,693) in accounts payable, accrued bonuses, accrued expenses, contract liability and other liabilities. Net cash used in operating activities consisted of payments for research and development, legal, professional and consulting expenses, rent and other expenditures necessary to develop our business infrastructure.

Net cash used by investing activities was $2,697,899 for the year ended December 31, 2024, consisting of $430,501 in cost for intangibles and $2,267,398 in asset additions for the Colorado headquarter facility and labs.

Net cash provided by financing activities was $14,484,291 for the year ended December 31, 2024, and consisted of $337,350 in proceeds from exercise of options and warrants, $12,366,965 in proceeds from resale of common stock to an institutional investor and $1,779,976 in proceeds from at the market sale of common stock by an investment banking company.

On December 31, 2024, our cash and cash equivalents totaled $27,667,964, our assets totaled $37,807,983, our liabilities totaled $4,384,078 and we had stockholders' equity of $33,423,905.

For the year ended December 31, 2023

Net cash used in operating activities was $12,236,024 for the year ended December 31, 2023, primarily attributable to the net loss of $21,038,032 adjusted by $6,459,387 in options issued for services, $262,697 amortization of deferred compensation, $673,578 in common stock issued for services, $1,119,141 in depreciation expenses and patent amortization expenses, $184,835 amortization of right of use asset, $215,509 gain on disposal of property and equipment, ($587,540) in prepaid expenses, $935,795 in accounts receivable, accounts payable, accrued bonuses, accrued expenses, deferred revenue and other liabilities. Net cash used in operating activities consisted of payments for research and development, legal, professional and consulting expenses, rent and other expenditures necessary to develop our business infrastructure.

Net cash used by investing activities was $2,957,201 for the year ended December 31, 2023, consisting of $307,687 in cost for intangibles, $3,292,224 in asset additions for the Colorado headquarter facility and labs offset by $642,120 in a loan repayment and $590 in proceeds on sale of property and equipment.

Net cash provided by financing activities was $22,523,161 for the year ended December 31, 2023, and consisted of $1,013,924 in proceeds from exercise of options and warrants, $19,993,359 in proceeds from resale of common stock to an institutional investor and $1,515,878 in proceeds from at the market sale of common stock by an investment banking company.

On December 31, 2023, our cash and cash equivalents totaled $31,432,087, our assets totaled $41,783,585, our liabilities totaled $5,349,771 and we had stockholders' equity of $36,433,814.

Contractual Obligations

See "Note 8–Leases" of the notes to the financial statements contained elsewhere within this Annual Report on Form 10-K for a discussion of our operating lease for office and laboratory space.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

At December 31, 2024, we had $27.6 million in cash and cash equivalents. For the purposes of this Item 7A. we consider all highly liquid instruments with maturities of three months or less at the time of purchase to be cash equivalents. The fair value of all of our cash equivalents is determined based on "Level 1" inputs, which are based upon quoted prices for identical or similar instruments in markets that are active. We do not use any market risk sensitive instruments to hedge any risks, and we hold no market risk sensitive instruments for trading or speculative purposes. We place our cash investments in instruments that meet credit quality standards. At December 31, 2024, we had deposits with a financial institution that exceeded the Federal Depository Insurance coverage.

Market Interest Rate Risk

We are exposed to market risk related to changes in interest rates. Our primary exposure to market risk is interest rate sensitivity, which is affected by changes in the general level of U.S. interest rates. If a 10% change in interest rates had occurred on December 31, 2024, this change would not have had a material effect on the fair value of our investment portfolio as of that date.

Due to the short holding period of our investments and the nature of our investments, we have concluded that we do not have a material financial market risk exposure.

Item 8. Financial Statements and Supplementary Data

Our Financial Statements are attached as Appendix A (following Exhibits) and included as part of this Form 10-K Report. A list of our Financial Statements is provided in response to Item 15 of this Form 10-K Report.

Item 9. Changes In and Disagreements With Accountants On Accounting and Financial Disclosure

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

As of December 31, 2024, our Company evaluated the effectiveness and design and operation of its disclosure controls and procedures. Our Company's disclosure controls and procedures are the controls and other procedures that we designed to ensure that our Company records, processes, summarizes, and reports in a timely manner the information that it must disclose in reports that our Company files with or submits to the Securities and Exchange Commission. Our principal executive officer and principal financial officer reviewed and participated in this evaluation. Based on this evaluation, our Company made the determination that its disclosure controls and procedures were effective.

Management's Annual Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f) and 15d-15(f). Under the supervision and with the participation of management, including our principal executive officer and principal financial officer, we conducted an evaluation of the effectiveness of our internal controls over financial reporting based on the framework in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Based on this evaluation, management has concluded that our internal control over financial reporting was effective as of December 31, 2024.

The Company's internal control over financial reporting includes policies and procedures that (1) pertain to maintenance of records that, in reasonable detail, accurately and fairly reflect transactions and dispositions of the assets of the Company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the Company's assets that could have a material effect on the financial statements.

Our management, including our principal executive officer and principal financial officer, does not expect that our disclosure controls or our internal control over financial reporting will prevent or detect all errors and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. Internal control over financial reporting is a process that involves human diligence and compliance and is subject to lapses in judgment and breakdowns resulting from human failures. In addition, the design of any system of controls is based in part on certain assumptions about the likelihood of future events, and controls may become inadequate if conditions change. There can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions.

Attestation Report of the Registered Public Accounting Firm

This Annual Report does not include an attestation report of our Company's independent registered public accounting firm regarding internal control over financial reporting. Management's report was not subject to attestation by our Company's registered public accounting firm pursuant to rules of the Securities and Exchange Commission that permit our Company to provide only management's attestation in this Annual Report.

Changes in Internal Control Over Financial Reporting

No change in our Company's internal control over financial reporting occurred during our fourth fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

(a) Lincoln Park Purchase Agreement

On March 17, 2025, Lightwave Logic, Inc. (the "Company"), entered into a purchase agreement (the "Purchase Agreement") with Lincoln Park Capital Fund, LLC ("Lincoln Park" or "Investor") (each, a "Party", and together, the "Parties"), which provides that, upon the terms and subject to the conditions and limitations set forth therein, the Company may sell to Lincoln Park up to $30,000,000 of shares (the "Purchase Shares") of its common stock, par value $0.001 per share (the "Common Stock").

Concurrently with entering into the Purchase Agreement, the Company also entered into a registration rights agreement with Lincoln Park, pursuant to which it agreed to provide Lincoln Park with certain registration rights related to the shares issued under the Purchase Agreement (the "Registration Rights Agreement").

Beginning one business day following the date of satisfaction of certain conditions set forth in the Purchase Agreement (the "Commencement Date") and over the thirty-six (36) month term following the Commencement Date, the Company has the right, but not the obligation, on any business day selected by the Company (each, a "Purchase Date"), to require Lincoln Park to purchase up to 250,000 shares of Common Stock (the "Regular Purchase Share Limit") (each such purchase, a "Regular Purchase"). Lincoln Park's committed obligation under each Regular Purchase shall not exceed $3,000,000 (subject to adjustment for any reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction as provided in the Purchase Agreement), provided that the Parties may mutually agree at any time to increase the Regular Purchase Share Limit. The Company shall have the right to submit multiple Regular Purchase notices to the Investor as often as every business day, provided that the Company has not failed to deliver shares for the most recent prior Regular Purchase.

The purchase price per share for each such Regular Purchase (the "Purchase Price") shall be equal to the lesser of: (i) the lowest sale price of the Common Stock during the Purchase Date and (ii) the average of the three (3) lowest closing sale prices of the Common Stock during the ten (10) business days immediately preceding such Purchase Date.

In addition to Regular Purchases and provided that the Company has directed a Regular Purchase in full, the Company in its sole discretion may require Lincoln Park on each Purchase Date to purchase on the following business day (each, an "Accelerated Purchase Date") up to the lesser of: (i) three (3) times the number of shares purchased pursuant to such Regular Purchase and (ii) 30% of the trading volume on Nasdaq during all or, if certain trading volume or market price thresholds specified in the Purchase Agreement are crossed on the applicable Accelerated Purchase Date, the portion of the normal trading hours on the applicable Accelerated Purchase Date prior to such time that any one of such thresholds is crossed, which period of time on the applicable Accelerated Purchase Date (each such purchase, an "Accelerated Purchase").

The purchase price per share for each such Accelerated Purchase shall be equal to the lesser of: (i) the closing sale price on the Accelerated Purchase Date or (ii) 96.5% of the Accelerated Purchase Date's volume weighted average price (the "Accelerated Purchase Price"). The Parties may mutually agree to increase the number of shares of Common Stock sold to the Investor pursuant to any Accelerated Purchase.

The Company may also direct Lincoln Park, on any business day on which an Accelerated Purchase has been completed and all of the shares to be purchased thereunder have been properly delivered to Lincoln Park in accordance with the Purchase Agreement, to make additional purchases upon the same terms as an Accelerated Purchase, (an "Additional Accelerated Purchase"). The Company may direct multiple Additional Accelerated Purchases in a day provided that delivery of shares has been completed with respect to any prior Regular and Accelerated Purchases that Lincoln Park has purchased.

The purchase price of Regular Purchases, Accelerated Purchases and Additional Accelerated Purchases and the minimum closing sale price for a Regular Purchase will be adjusted for any reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction occurring during the business days used to compute the purchase price. The aggregate number of shares that the Company can sell to Lincoln Park under the Purchase Agreement may in no case exceed 24,910,904 shares (subject to adjustment as described above), which is equal to approximately 19.99% of the shares of Common Stock outstanding immediately prior to the execution of the Purchase Agreement (the "Exchange Cap"), unless (i) stockholder approval is obtained to issue shares above the Exchange Cap, in which the Exchange Cap will no longer apply, or (ii) the average price of all applicable sales of Common Stock to Lincoln Park under the Purchase Agreement equals or exceeds $1.06 per share (subject to adjustment as described above) (which represents the lower of (A) the official closing price of the Common Stock on Nasdaq immediately preceding the signing of the Purchase Agreement and (B) the average official closing price of the Common Stock on Nasdaq for the five consecutive trading days ending on the trading day immediately preceding the date of the Purchase Agreement). In any event, the Purchase Agreement specifically provides that the Company may not issue or sell any shares of Common Stock under the Purchase Agreement if such issuance or sale would breach any applicable rules or regulations of Nasdaq.

The Purchase Agreement also prohibits the Company from directing Lincoln Park to purchase any shares of Common Stock if those shares, when aggregated with all other shares of Common Stock then beneficially owned by Lincoln Park, would result in Lincoln Park beneficially owning more than 4.99% of its outstanding shares of Common Stock, or at the option of Lincoln Park following the satisfaction of certain conditions, 9.99% of the outstanding shares of Common Stock.

On March 17, 2025, we issued 245,098 shares of Common Stock to Lincoln Park as an initial fee for its commitment to purchase shares of our common stock under the Purchase Agreement (the "Initial Commitment Shares"). We may issue up to 490,196 additional shares of Common Stock pro-rata in connection with the sale of Purchase Shares (the "Additional Commitment Shares" and together with the Initial Commitment Shares, the "Commitment Shares").

The Purchase Agreement contains customary representations, warranties, covenants, Suspension Events (as defined in the Purchase Agreement), closing conditions, indemnification and termination provisions. During any Suspension Event specified in the Purchase Agreement, we may not initiate any sales to Lincoln Park until such Suspension Event is cured. Lincoln Park does not have the right to terminate the Purchase Agreement upon the occurrence of a Suspension Event. There are no restrictions on future financings, rights of first refusal, participation rights, penalties or liquidated damages in the Purchase Agreement or the Registration Rights Agreement, other than the Company's agreement not to enter into any Variable Rate Transactions (as defined in the Purchase Agreement) with any third party, subject to certain exceptions set forth in the Purchase Agreement, over the thirty-six (36) month term following the date of the Purchase Agreement (irrespective of any earlier termination of the Purchase Agreement in accordance with the terms therein).

The Purchase Agreement may be terminated by the Company at any time after the Commencement Date, at its sole discretion, without any cost or penalty, by giving one business day notice to Lincoln Park to terminate the Purchase Agreement. Lincoln Park has covenanted not to cause or engage in any manner whatsoever, any direct or indirect short selling or hedging of the Common Stock.

The foregoing is a summary description of certain terms of the Purchase Agreement and the Registration Rights Agreement and, by its nature, is incomplete. Copies of the Purchase Agreement and the Registration Rights Agreement are filed as Exhibits 10.33 and 10.34 attached hereto. The foregoing descriptions of the Purchase Agreement and the Registration Rights Agreement are qualified in their entirety by reference to such exhibits. The Purchase Agreement and Registration Rights Agreement contain customary representations and warranties, covenants and indemnification provisions that the parties made to, and solely for the benefit of, each other in the context of all of the terms and conditions of such agreements and in the context of the specific relationship between the parties thereto. The provisions of the Purchase Agreement and the Registration Rights Agreement, including any representations and warranties contained therein, are not for the benefit of any party other than the parties thereto and are not intended as documents for investors and the public to obtain factual information about the current state of affairs of the parties thereto. Rather, investors and the public should look to other disclosures contained in the Company's annual, quarterly and current reports it may file with the Securities and Exchange Commission.

The information contained in this Item 9B shall not constitute an offer to sell or the solicitation of an offer to buy the shares of the Company's Common Shares discussed herein, nor shall there be any offer, solicitation or sale of the shares in any jurisdiction in which such offer, solicitation or sale would be unlawful prior to registration or qualification under the securities laws of any such jurisdiction.

(b) Trading Arrangements

During the three months ended December 31, 2024, none of our directors or officers (as defined in Rule 16a-1(f) under the Exchange Act) adopted or terminated any contract, instruction or written plan for the purchase or sale of our securities that was intended to satisfy the affirmative defense conditions of Rule 10b5-1(c) under the Exchange Act or any "non-Rule 10b5-1 arrangement" as defined in Item 408(c) of Regulation S-K.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

Information required under this Item will be contained in our definitive proxy statement, which will be filed within 120 days of December 31, 2024, our most recent fiscal year end, and is incorporated herein by reference.

Item 11. Executive Compensation.

Information required under this Item will be contained in our definitive proxy statement, which will be filed within 120 days of December 31, 2024, our most recent fiscal year end, and is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

Information required under this Item will be contained in our definitive proxy statement, which will be filed within 120 days of December 31, 2024, our most recent fiscal year end, and is incorporated herein by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

Information required under this Item will be contained in our definitive proxy statement, which will be filed within 120 days of December 31, 2024, our most recent fiscal year end, and is incorporated herein by reference.

Item 14. Principal Accountant Fees and Services.

Information required under this Item will be contained in our definitive proxy statement, which will be filed within 120 days of December 31, 2024, our most recent fiscal year end, and is incorporated herein by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The following Audited Financial Statements are filed as part of this Form 10-K Report:

Report of Independent Registered Public Accounting Firm
Balance Sheets
Statements of Comprehensive Loss
Statement of Stockholders' Equity
Statements of Cash Flows
Notes to Financial Statements

(b) The following exhibits are filed as part of this report.

Exhibit No.	Description of Exhibit	Location
3.1	Articles of Incorporation	Incorporated by reference to Company's Form 10-SB as filed with the SEC on April 13, 2007
3.2	Certificate of Amendment to Articles of Incorporation	Incorporated by reference to Company's Definitive Schedule 14C Information Statement as filed with the SEC on February 19, 2008
3.3	Certificate of Amendment to Articles of Incorporation	Incorporated by reference to Company's Form S-1 Registration Statement as filed with the SEC on August 3, 2015
3.4	Second Amended and Restated Bylaws – June 18, 2024	Incorporated by reference to the Company's Form 10-Q as filed with the SEC on June 25, 2024
4.1	Description of Registrant's Securities	Filed herewith
10.1	Employee Agreement - Yves Lemaitre	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on December 13, 2024.
10.2	Employee Agreement - Thomas Zelibor	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on December 13, 2024
10.3	Employee Agreement - James Marcelli	Incorporated by reference to Company's Form 10-Q as filed with the SEC on August 12, 2015
10.4	Employee Agreement Amendment - James Marcelli	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on April 20, 2021
10.5	Employee Agreement Amendment - James Marcelli	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on January 21, 2022
10.6	Employee Agreement Amendment – James Marcelli	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on April 27, 2023
10.7	Employee Agreement Amendment – James S. Marcelli	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on June 25, 2024
10.8	Employee Agreement – Michael Lebby	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on March 22, 2017
10.9	Employee Agreement Amendment - Michael Lebby	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on April 20, 2021
10.10	Employee Agreement Amendment - Michael Lebby	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on January 21, 2022
10.11	Employee Agreement Amendment – Michael Lebby	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on April 27, 2023
10.12	Employee Agreement Amendment – Michael Lebby	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on June 25, 2024
10.13	Form of Executive Paid Time Off Waiver Agreement	Incorporated by reference to the Company's Form 10-K as filed with the SEC on March 16, 2018
10.14	Form of Director Agreement	Incorporated by reference to the Company's Form 10-K as filed with the SEC on March 16, 2018
10.15	Form of Director and Officer Indemnification Agreement	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on January 21, 2022
10.16	Form of Director's Non-Disclosure Agreement	Incorporated by reference to the Company's Form 10-K as filed with the SEC on March 16, 2018

Exhibit No.	Description of Exhibit	Location
10.17	Operations Committee Charter	Incorporated by reference to the Company's Form 10-Q as filed with the SEC on August 15, 2016
10.18	Statement of Operations Committee Work - Frederick J. Leonberger	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on April 3, 2017
10.19	Statement of Operations Committee Work - Siraj Nour El-Ahmadi	Incorporated by reference to the Company's Form 10-K as filed with the SEC on March 31, 2021
10.20	2007 Employee Stock Plan	Incorporated by reference to Company's Definitive Schedule 14C Information Statement as filed with the SEC on February 19, 2008
10.21	2007 Employee Stock Plan Amendment	Incorporated by reference to Company's Definitive Schedule 14A Proxy Statement as filed with the SEC on July 22, 2014
10.22	2016 Equity Incentive Plan	Incorporated by reference to Appendix A to the Company's Definitive Schedule 14A filed with the SEC on April 20, 2016
10.23	2016 Equity Incentive Plan Amendment	Incorporated by reference to Appendix A to the Company's Definitive Schedule 14A filed with the SEC on April 12, 2019
10.24	2016 Equity Incentive Plan Amendment No. 2	Incorporated by reference to Appendix A to the Company's Definitive Schedule 14A filed with the SEC on April 14, 2023
10.25	Form of Non-qualified Stock Option Award Agreement - Employees	Incorporated by reference to the Company's Annual Report on Form 10-K as filed with the SEC on March 17, 2017
10.26	Form of Non-qualified Stock Option Award Agreement - Executive Officers	Incorporated by reference to the Company's Annual Report on Form 10-K as filed with the SEC on March 17, 2017
10.27	Form of Non-qualified Stock Option Award Agreement - Non Employee Directors	Incorporated by reference to the Company's Annual Report on Form 10-K as filed with the SEC on March 17, 2017
10.28	Form of Restricted Stock Award Agreement -Non Employee Directors	Incorporated by reference to the Company's Annual Report on Form 10-K as filed with the SEC on March 1, 2022
10.29	Lease Agreement dated October 26, 2017	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on November 2, 2017
10.30	First Amendment to the October 26, 2017 Lease Agreement dated November 22, 2022	Incorporated by reference to Company's Form 10-K as filed with the SEC on March 1, 2023
10.31	Purchase Agreement, dated February 28, 2023, by and between the Company and Lincoln Park	Incorporated by reference to Company's Form 10-K as filed with the SEC on March 1, 2023
10.32	Registration Rights Agreement, dated February 28, 2023, by and between the Company and Lincoln Park	Incorporated by reference to Company's Form 10-K as filed with the SEC on March 1, 2023
10.33	Purchase Agreement, dated March 17, 2025, by and between the Company and Lincoln Park	Filed herewith
10.34	Registration Rights Agreement, dated March 17, 2025, by and between the Company and Lincoln Park	Filed herewith
14.1	Code of Ethics and Business Conduct	Incorporated by reference to the Company's Form 10-K as filed with the SEC on March 16, 2018
16.1	Letter from Morison Cogen LLP to the Securities and Exchange Commission dated October 4, 2024	Incorporated by reference to the Company's Current Report on Form 8-K as filed with the SEC on October 4, 2024
19.1	Insider Trading Policy	Incorporated by reference to the Company's Form 10-K as filed with the SEC on February 29, 2024
21.1	Subsidiaries of the Registrant	Incorporated by reference to the Company's Form 10-K as filed with the SEC on February 29, 2024

Exhibit No.	Description of Exhibit	Location
23.1	Consent of Independent Registered Public Accounting Firm - Stephano Slack LLC	Filed herewith
23.2	Consent of Independent Registered Public Accounting Firm - Morison Cogen LLP	Filed herewith
31.1	Certification pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934, as amended, executed by the Principal Executive Officer of the Company.	Filed herewith
31.2	Certification pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934, as amended, executed by the Principal Financial Officer of the Company.	Filed herewith
32.1	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, executed by the Principal Executive Officer of the Company.	Furnished
32.2	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, executed by the Principal Financial Officer of the Company.	Furnished
97.1	Compensation Clawback Policy	Incorporated by reference to the Company's Form 10-K as filed with the SEC on February 29, 2024
101.INS	Inline XBRL Instance Document (the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document)	
101.SCH	Inline XBRL Taxonomy Extension Schema Document	
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document	
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document	
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document	
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document	
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)	

Item 16. Form 10-K Summary

None

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

LIGHTWAVE LOGIC, INC.
Registrant

By: /s/ Yves LeMaitre
Yves LeMaitre,
Chief Executive Officer
(Principal Executive Officer)

Date: March 18, 2025

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Yves LeMaitre Yves LeMaitre	Chief Executive Officer, Principal Executive Officer, Director	March 18, 2025
/s/ James S. Marcelli James S. Marcelli	Chief Financial Officer, Chief Operating Officer, Principal Financial/Accounting Officer, Secretary, Director	March 18, 2025
/s/ Ronald A. Bucchi Ronald A. Bucchi	Director, Chair of the Board of Directors	March 18, 2025
/s/ Siraj Nour El-Ahmadi Siraj Nour El-Ahmadi	Director	March 18, 2025
/s/ Craig Ciesla Craig Ciesla	Director	March 18, 2025
/s/ Laila Partridge Laila Partridge	Director	March 18, 2025
/s/ Thomas M. Connelly, Jr. Thomas M. Connelly, Jr.	Director	March 18, 2025

LIGHTWAVE LOGIC, INC.

FINANCIAL STATEMENTS

DECEMBER 31, 2024 AND 2023

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To the Board of Directors and
Stockholders of Lightwave Logic, Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying balance sheet of Lightwave Logic, Inc. (the Company) as of December 31, 2024, and the related statements of comprehensive loss, stockholders' equity, and cash flows for the year ended December 31, 2024, and the related notes (collectively referred to as the financial statements).

In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2024, and the results of its operations and its cash flows for the year ended December 31, 2024, in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audit. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audit, we are required to obtain an understanding of internal control over financial reporting, but not for the purpose of expressing an opinion on the effectiveness of the company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audit included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audit also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audit provides a reasonable basis for our opinion.

Critical Audit Matters

Critical audit matters are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. We determined that there are no critical audit matters.

/s/ Stephano Slack LLC

We have served as the Company's auditor since 2024.

Wayne, Pennsylvania
March 18, 2025

To the Board of Directors and
Stockholders of Lightwave Logic, Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying balance sheet of Lightwave Logic, Inc. (the Company) as of December 31, 2023, and the related statements of comprehensive loss, stockholders' equity, and cash flows for the year then ended, and the related notes (collectively referred to as the financial statements). We also have audited the Company's internal control over financial reporting as of December 31, 2023, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2023, and the results of its operations and its cash flows for the year then ended, in conformity with accounting principles generally accepted in the United States of America. Also, in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2023, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by COSO.

Basis for Opinions

The Company's management is responsible for these financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's financial statements and an opinion on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audit of the financial statements included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audit also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

Critical audit matters are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. We determined that there are no critical audit matters.

/s/ Morison Cogen LLP

We served as the Company's auditor from 2005 to 2024.

Blue Bell, Pennsylvania
February 29, 2024

LIGHTWAVE LOGIC, INC.
BALANCE SHEETS

	December 31, 2024	December 31, 2023
ASSETS		
CURRENT ASSETS		
Cash and cash equivalents	$ 27,667,964	$ 31,432,087
Accounts Receivable	45,565	30,376
Prepaid expenses and other current assets	401,741	1,237,621
	28,115,270	32,700,084
PROPERTY AND EQUIPMENT - net of accumulated depreciation of $6,037,723 and $4,674,560	5,691,545	4,990,790
OTHER ASSETS		
Intangible assets - net of accumulated amortization of $771,631 and $659,250	1,355,445	1,254,501
Operating Lease - Right of Use - Building	2,645,723	2,838,210
	4,001,168	4,092,711
TOTAL ASSETS	$ 37,807,983	$ 41,783,585
LIABILITIES AND STOCKHOLDERS' EQUITY		
CURRENT LIABILITIES		
Accounts payable	$ 515,955	$ 1,447,596
Accrued bonuses and accrued expenses	877,165	599,430
Accounts payable and accrued expenses - related parties	200,779	313,483
Contract liability	23,208	39,875
Deferred lease liability	—	38,297
Operating lease liability	168,289	144,120
	1,785,396	2,582,801
LONG TERM LIABILITIES		
Operating lease liability	2,598,682	2,766,970
	2,598,682	2,766,970
TOTAL LIABILITIES	4,384,078	5,349,771
STOCKHOLDERS' EQUITY		
Preferred stock, $0.001 par value, 1,000,000 authorized, no shares issued or outstanding	—	—
Common stock $0.001 par value, 250,000,000 authorized, 123,301,653 and 118,137,309 issued and outstanding at December 31, 2024 and December 31, 2023	123,302	118,137
Additional paid-in-capital	184,363,772	164,619,363
Deferred compensation	(656,735)	(432,293)
Accumulated deficit	(150,406,434)	(127,871,393)
TOTAL STOCKHOLDERS' EQUITY	33,423,905	36,433,814
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$ 37,807,983	$ 41,783,585

The accompanying notes are an integral part of these financial statements.

LIGHTWAVE LOGIC, INC.
STATEMENTS OF COMPREHENSIVE LOSS
FOR THE YEARS ENDED DECEMBER 31, 2024 AND 2023

	2024	2023
NET SALES	$ 95,605	$ 40,502
COST AND EXPENSE		
Cost of sales	7,395	2,513
Research and development	16,806,548	15,903,689
General and administrative	6,370,805	5,359,565
	23,184,748	21,265,767
LOSS FROM OPERATIONS	(23,089,143)	(21,225,265)
OTHER INCOME (EXPENSE)		
Interest income	926,854	657,546
Commitment fee	(154,210)	(673,578)
(Loss) gain on disposal of property and equipment and intangible assets	(213,440)	215,509
Other (expense)	(5,102)	(12,244)
NET LOSS	$ (22,535,041)	$ (21,038,032)
LOSS PER SHARE		
Basic	$ (0.19)	$ (0.18)
Diluted	$ (0.19)	$ (0.18)
WEIGHTED AVERAGE NUMBER OF SHARES		
Basic	120,599,885	115,467,300
Diluted	120,599,885	115,467,300

The accompanying notes are an integral part of these financial statements.

LIGHTWAVE LOGIC, INC.
STATEMENTS OF STOCKHOLDERS' EQUITY
FOR THE YEARS ENDED DECEMBER 31, 2024 AND 2023

	Number of Shares	Common Stock	Additional Paid-in Capital	Deferred Compensation	Accumulated Deficit	Total
BALANCE AT DECEMBER 31, 2023	118,137,309	$ 118,137	$ 164,619,363	$ (432,293)	$ (127,871,393)	$ 36,433,814
Common stock issued to institutional investor	3,850,000	3,850	12,363,115	—	—	12,366,965
Common stock issued for commitment shares	41,956	42	154,168	—	—	154,210
Common stock sales at the market by investment banking company	551,501	552	1,779,424	—	—	1,779,976
Exercise of options	375,000	375	245,725	—	—	246,100
Exercise of warrants	119,000	119	91,131	—	—	91,250
Options issued for services	—	—	4,440,003	—	—	4,440,003
Restricted stock awards issued for future services	226,887	227	670,843	(671,070)	—	—
Deferred compensation	—	—	—	446,628	—	446,628
Net loss for the year ended December 31, 2024	—	—	—	—	(22,535,041)	(22,535,041)
BALANCE AT DECEMBER 31, 2024	123,301,653	$ 123,302	$ 184,363,772	$ (656,735)	$ (150,406,434)	$ 33,423,905

	Number of Shares	Common Stock	Additional Paid-in Capital	Deferred Compensation	Accumulated Deficit	Total
BALANCE AT DECEMBER 31, 2022	112,882,793	$ 112,883	$ 134,406,825	$ (133,324)	$ (106,833,361)	$ 27,553,023
Common stock issued to institutional investor	3,650,400	3,650	19,989,709	—	—	19,993,359
Common stock issued for commitment shares	112,739	113	673,465	—	—	673,578
Common stock sales at the market by investment banking company	202,115	202	1,515,676	—	—	1,515,878
Exercise of options	914,408	914	776,760	—	—	777,674
Exercise of warrants	269,000	269	235,981	—	—	236,250
Options issued for services	—	—	6,459,387	—	—	6,459,387
Restricted stock awards issued for future services	105,854	106	561,560	(561,666)	—	—
Deferred compensation	—	—	—	262,697	—	262,697
Net loss for the year ended December 31, 2023	—	—	—	—	(21,038,032)	(21,038,032)
BALANCE AT DECEMBER 31, 2023	118,137,309	$ 118,137	$ 164,619,363	$ (432,293)	$ (127,871,393)	$ 36,433,814

The accompanying notes are an integral part of these financial statements.

LIGHTWAVE LOGIC, INC.
STATEMENTS OF CASH FLOWS
FOR THE YEARS ENDED DECEMBER 31, 2024 AND 2023

	2024	2023
CASH FLOWS FROM OPERATING ACTIVITIES		
Net loss	$ (22,535,041)	$ (21,038,032)
Adjustments to reconcile net loss to net cash used in operating activities		
Stock options issued for services	4,440,003	6,459,387
Amortization of deferred compensation	446,628	262,697
Common stock issued for commitment shares	154,210	673,578
Depreciation and amortization of patents	1,682,760	1,119,141
Amortization of right of use asset	192,487	184,835
Loss (gain) on disposal of property and equipment and intangible assets	213,440	(215,509)
Decrease (increase) in assets		
Accounts receivable	(15,189)	(30,376)
Prepaid expenses and other current assets	835,880	(587,540)
(Decrease) increase in liabilities		
Accounts payable	(931,641)	655,925
Accrued bonuses, accrued expenses and other liabilities	277,735	219,150
Accounts payable and accrued expenses-related parties	(112,704)	213,314
Contract liability	(16,667)	39,875
Deferred lease liability	(38,297)	(41,778)
Operating lease liability	(144,119)	(150,691)
Net cash used in operating activities	(15,550,515)	(12,236,024)
CASH FLOWS FROM INVESTING ACTIVITIES		
Cost of intangibles	(430,501)	(307,687)
Purchase of property and equipment	(2,267,398)	(3,292,224)
Repayment of loan	—	642,120
Sale of property and equipment	—	590
Net cash used in investing activities	(2,697,899)	(2,957,201)
CASH FLOWS FROM FINANCING ACTIVITIES		
Exercise of options and warrants	337,350	1,013,924
Issuance of common stock, institutional investor	12,366,965	19,993,359
Common stock sales at the market by investment banking company	1,779,976	1,515,878
Net cash provided by financing activities	14,484,291	22,523,161
NET (DECREASE) INCREASE IN CASH AND CASH EQUIVALENTS	(3,764,123)	7,329,936
CASH AND CASH EQUIVALENTS - BEGINNING OF YEAR	31,432,087	24,102,151
CASH AND CASH EQUIVALENTS - END OF YEAR	$ 27,667,964	$ 31,432,087
Supplemental Disclosure of Non-cash investing and financing activities:		
Amended Operating Lease - Right of Use - Building and Operating lease liability	$ —	$ 2,703,527

The accompanying notes are an integral part of these financial statements.

NOTE 1 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

History and Nature of Business
Lightwave Logic, Inc is a technology platform company leveraging its proprietary engineered electro-optic (EO) polymers, named Perkinamine® to transmit data at higher speeds with less power in a small form factor. The Company's high activity and high stability organic polymers allow it to create next-generation photonic EO devices that convert data from electrical signals into light/optical signals for applications in telecommunications, and for data transmission potentially used to support generative AI.

The Company's first revenue stream is from a technology material supply and licensing agreement that incorporates the Company's patented electro-optic polymer materials for use in manufacturing photonic devices. Currently, the Company is in various stages of materials development and evaluation with potential customers and strategic partners. The Company expects to continue to obtain a revenue stream from technology licensing agreements, and to obtain additional revenue streams from technology transfer agreements and direct sale of its electro-optic materials.

The Company's current development activities are subject to significant risks and uncertainties, including failing to secure additional funding to operationalize the Company's technology now under development.

Lightwave Logic, Inc. was organized under the laws of the State of Nevada in 1997, and it commenced with its current business plan in 2004.

Basis of Presentation
The accompanying financial statements are presented in accordance with accounting principles generally accepted in the United States of America.

Estimates
The preparation of financial statements in conformity with accounting principles generally accepted in the United States requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying disclosures. Although these estimates are based on management's best knowledge of current events and actions the Company may undertake in the future, actual results could differ from the estimates.

Cash Equivalents
The Company considers all highly liquid investments with an original maturity from the date of purchase of three months or less to be cash equivalents.

Concentration of Credit Risk
Certain financial instruments potentially subject the Company to concentrations of credit risk. These financial instruments consist primarily of cash. At December 31, 2024, the Company did have deposits with a financial institution that exceed the Federal Depository Insurance coverage.

Accounts Receivable
Accounts receivable are carried at their contractual amounts, less an estimated allowance for credit losses. Management estimates the allowance for credit losses using a loss-rate approach based on historical loss information, adjusted for management's expectations about current and future economic conditions, as the basis to determine expected credit losses. Management exercises significant judgment in determining expected credit losses. Key inputs include macroeconomic factors, industry trends, the creditworthiness of counterparties, historical experience, the financial conditions of the customers, and the amount and age of past due accounts. Management believes that the composition of receivables at year-end is consistent with historical conditions as credit terms and practices and the client base has not changed significantly. Receivables are considered past due if full payment is not received by the contractual due date, which is typically 30 days from the invoice date. Past due accounts are generally written off against the allowance for credit losses only after all collection attempts have been exhausted. The allowance for credit losses was zero as of December 31, 2024 and 2023.

There was one customer who represented 100% of total accounts receivable as of December 31, 2024.

NOTE 1 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

Property and Equipment
Property and equipment is stated at the Company's original cost or fair value for acquired property and equipment net of accumulated depreciation. Depreciation of property and equipment is computed using the straight-line method over the estimated useful lives of the respective assets, which are generally as follows: 3 years for office equipment, 3 to 5 years for lab equipment, 7 years for furniture and 3 years for software. Leasehold improvements are amortized over the lesser of remaining life of the lease or. Leasehold improvements are amortized over the lesser of remaining life of the lease or useful life of the asset, using the straight-line method. The cost of normal maintenance and repairs is charged to operating expenses as incurred. Material expenditures that increase the life of an asset are capitalized and depreciated over the estimated remaining useful life of the asset. The cost of assets sold, or otherwise disposed of, and the related accumulated depreciation is relieved from the property accounts, and any gains or losses are recognized in income from continued operations.

Intangible Assets
Definite-lived intangible assets are stated at cost. Patents are amortized over their estimated useful lives, commencing from the date of grant for the remaining legal lives of the patents. The patents generally have a term of up to 20 years from the date of filing of the earliest related patent application. When certain patent applications are abandoned by the Company for claims that are covered by patents already granted to the Company, the cost of patent applications are removed from the accounts and the resulting expense is reflected in the statement of comprehensive loss.

Fair Value of Financial Instruments
The carrying value of the Company's short-term financial instruments such as cash, accounts payable and accrued expenses approximate their fair values because of their short maturities.

Revenue Recognition and Contract Liability

The Company recognizes revenue in accordance with Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") Topic 606, Revenue from Contracts with Customers. Under ASC 606, revenue is recognized when control of goods or services is transferred to a customer in an amount that reflects the consideration to which the Company expects to be entitled.

To achieve this, the Company applies the five-step model:

1. Identify the contract with a customer.
2. Identify the performance obligations in the contract.
3. Determine the transaction price for the contract.
4. Allocate the transaction price to the performance obligations.
5. Recognize revenue as performance obligations are satisfied.

The Company's primary revenue stream includes technology license and material supply agreements.

NOTE 1 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

Revenue Recognition and Contract Liability (Continued)

Technology License and Material Supply Agreements
The Company enters into technology license and material supply agreements, under which it grants customers a non-exclusive, royalty-bearing license to use its patented electro-optic polymer technology (the "Licensed Product"). The Company also supplies proprietary polymers to licensees for use in their manufacturing of photonic devices.

The Company assesses whether the license and the supply of proprietary polymers represent distinct performance obligations. Based on this assessment, the Company has determined that the license and material supply are not distinct for financial reporting purposes because they are highly interdependent. Accordingly, the Company accounts for these as a single performance obligation.

Revenue under these agreements is recognized as follows:

Upfront License Fees – Nonrefundable upfront license fees are recorded as contract liability and recognized on a pro-rata basis over the contract term.

Minimum Annual Royalties – Fixed royalty payments required under the contract are also recognized on a pro-rata basis over the contract term.

Variable Royalties – Royalties exceeding the minimum annual amount are recognized when earned, typically when the licensee's sales exceed the minimum threshold.

Milestone Payments – Recognized only when the contractual milestone is achieved, such as when the licensee sells a specified number of units of the Licensed Product.

Contract Costs
The Company capitalizes incremental costs to obtain contracts if they are expected to be recoverable, in accordance with ASC 340-40, Other Assets and Deferred Costs – Contracts with Customers. These capitalized costs are amortized over the expected contract term in a manner consistent with the related revenue recognition.

Contract Liability

Contract liability represents amounts received in advance for performance obligations not yet satisfied, including nonrefundable upfront license fees. The Company recognizes contract liability revenue as revenue when the related performance obligations are satisfied.

Cost of Sales
Cost of sales consists of labor costs, material costs and manufacturing overhead costs associated with the production of materials transferred to the customer under the technology license and material supply agreement at the Company's facility.

NOTE 1 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

Income Taxes
The Company follows FASB ASC 740, "Income Taxes," which requires an asset and liability approach to financial accounting and reporting for income taxes. Deferred income tax assets and liabilities are computed annually for temporary differences between the financial statement and tax bases of assets and liabilities that will result in taxable or deductible amounts in the future based on enacted tax laws and rates applicable to the periods in which the differences are expected to affect taxable income. Valuation allowances are established when necessary to reduce deferred tax assets to the amount expected to be realized. Income tax expense is the tax payable or refundable for the period plus or minus the change during the period in deferred tax assets and liabilities.

Stock-based Payments
The Company accounts for stock-based compensation under the provisions of FASB ASC 718, "Compensation - Stock Compensation", which requires the measurement and recognition of compensation expense for all stock-based awards made to employees and directors based on estimated fair values on the grant date. The fair value of restricted stock awards is estimated by the market price of the Company's common stock at the date of grant. Restricted stock awards are being amortized to expense over the shorter of the requisite service period or the actual vesting period. The Company estimates the fair value of option and warrant awards on the date of grant using the Black-Scholes model. The value of the portion of the award that is ultimately expected to vest is recognized as expense over the shorter of the requisite service period or the actual vesting period, using the straight-line method. In June 2018, the FASB issued Accounting Standard Update ("ASU") No. 2018-07, *Compensation – Stock Compensation (Topic 718), Improvements to Nonemployee Share-Based Payment Accounting* (the "2018 Update). The amendments in the 2018 Update expand the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from non-employees. Prior to the 2018 Update, Topic 718 applied only to share- based transactions to employees. Consistent with the accounting requirement for employee share-based payment awards, nonemployee share-based payment awards within the scope of Topic 718 are measured at grant-date fair value of the equity instruments that an entity is obligated to issue when the good has been delivered or the service has been rendered and any other conditions necessary to earn the right to benefit from the instruments have been satisfied.

The Company has elected to account for forfeiture of stock-based awards as they occur.

Loss Per Share
The Company follows FASB ASC 260, "Earnings per Share", resulting in the presentation of basic and diluted earnings per share. Because the Company reported a net loss in 2024 and 2023, common stock equivalents, including stock options and warrants were anti-dilutive; therefore, the amounts reported for basic and dilutive loss per share were the same.

Leases
The Company is a lessee in operating leases primarily incurred to facilitate manufacturing, research and development, and selling, general and administrative activities. At contract inception, the Company determines if an arrangement is or contains a lease, and if so, recognizes a right-of-use asset and lease liability at the lease commencement date. For operating leases, the lease liability is measured at the present value of the unpaid lease payments at the lease commencement date, whereas for finance leases, the lease liability is initially measured at the present value of the unpaid lease payments and subsequently measured at amortized cost using the interest method. Operating lease right-of-use assets are included in other assets on the Balance Sheets. The short-term portion of operating lease liabilities is included in other current liabilities on the Balance Sheets and the long-term portion is included in long term liabilities on the Balance Sheets. As of December 31, 2024, the Company had no leases that qualified as financing arrangements.

NOTE 1 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

Leases (Continued)
Key estimates and judgments include how the Company determines the discount rate used to discount the unpaid lease payments to present value and the lease term. The Company monitors for events or changes in circumstances that could potentially require recognizing an impairment loss.

The Company elected a short-term lease exemption practical expedient under ASU 2026-02, "Leases" (Topic 842), which allows the Company to not recognize leases with the total lease term of 12 months or less on the balance sheet.

Impairment of Long Lived and Finite-Lived Intangible Assets
Long lived assets, such as property, equipment, and intangible assets subject to amortization, are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset group may not be recoverable, such as a significant decrease in market price of an asset group, a significant adverse change in legal factors or business climate that could affect the value of an asset group, or a continuous deterioration of the Company's financial condition. Recoverability of asset groups to be held and used is measured by comparing the undiscounted future cash flows expected to be generated by the asset group to the carrying amount of the asset group. If the carrying amount of the asset group exceeds its estimated undiscounted future cash flows, impairment is recognized to the extent that the carrying value exceeds its fair value. Fair value is determined through various valuation techniques, including discounted cash flow models, quoted market values, and third-party independent appraisals, as considered necessary.

For the years ended December 31, 2024 and 2023, the Company did not record an impairment of its long-lived and finite-lived intangible assets.

Comprehensive Loss
The Company follows FASB ASC 220.10, "Reporting Comprehensive Income (Loss)." Comprehensive loss is a more inclusive financial reporting methodology that includes disclosure of certain financial information that historically has not been recognized in the calculation of net loss. Since the Company has no items of other comprehensive loss, comprehensive loss is equal to net loss.

Recently Adopted Accounting Pronouncements
In November 2023, the FASB issued ASU 2023-07, Segment Reporting (Topic 280): Improvements to Reportable Segment Disclosures, which requires public entities to disclose significant segment expenses and other segment items on an interim and annual basis and provide in interim periods all disclosures about a reportable segment's profit or loss and assets that are currently required annually. The ASU does not change how a public entity identifies its operating segments, aggregates them, or applies the quantitative threshold to determine its reportable segments. The new disclosure requirements are also applicable to entities that account and report as a single operating segment entity. ASU 2023-07 is effective for fiscal years beginning after December 15, 2023, and for interim periods within fiscal years beginning after December 15, 2024. The Company adopted the guidance for the annual reporting period ended December 31, 2024. There was no impact on the Company's reportable segments identified and additional required disclosures have been included in Note 14 - Segment Reporting.

Recently Issued Accounting Pronouncements Not Yet Adopted
ASU 2023-09 – Income Taxes (Topic 740) requires disclosures related to the rate reconciliation and income taxes paid disclosures improve the transparency of income tax disclosures by requiring (1) consistent categories and greater disaggregation of information in the rate reconciliation and (2) income taxes paid disaggregated by jurisdiction. The other amendments in this Update improve the effectiveness and comparability of disclosures by (1) adding disclosures of pretax income (or loss) and income tax expense (or benefit) to be consistent with U.S. Securities and Exchange Commission (SEC) Regulation S-X 210.4-08(h), Rules of General Application—General Notes to Financial Statements: Income Tax Expense, and (2) removing disclosures that no longer are considered cost beneficial or relevant. For public business entities, the amendments in this Update are effective for annual periods beginning after December 15, 2024. The Company does not expect this ASU to have material impact on its disclosures in the year of adoption.

NOTE 1 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

Recently Issued Accounting Pronouncements Not Yet Adopted (Continued)
ASU 2024-03 – Income Statement – Reporting Comprehensive Income – Expense Disaggregation Disclosures (Subtopic 220-40) requires disclosure, in the notes to financial statements, of specified information about certain costs and expenses, such as the amounts of purchases of inventory, employee compensation, depreciation, intangible asset amortization, included in each relevant expense caption; disclosure of a qualitative description of the amounts remaining in relevant expense captions that are not separately disaggregated quantitatively; and disclosure of the total amounts of selling expenses. For public business entities, the amendments in this Update are effective for annual periods beginning after December 15, 2026 and interim reporting period within fiscal years beginning after December 15, 2027. Early adoption is permitted. The Company is evaluating the impact of this ASU on its financial statement disclosures.

NOTE 2 – MANAGEMENT'S PLANS

The Company's future expenditures and capital requirements will depend on numerous factors, including: the progress of our research and development efforts; the rate at which the Company can, directly or through arrangements with original equipment manufacturers, introduce and sell its polymer materials technology; the costs of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights; market acceptance of the Company's products and competing technological developments; and the Company's ability to establish cooperative development, joint venture and licensing arrangements. The Company expects that it will incur approximately $1,727,000 of expenditures per month over the next 12 months. The Company's current cash position enables it to finance its operations through April 2026. On March 17, 2025, the Company entered into a purchase agreement with an institutional investor to sell up to $30,000,000 of common stock over a 36-month period. As of the date of this filing, $30,000,000 remains available to the Company per the agreement. On February 28, 2023, the Company entered into a purchase agreement with an institutional investor to sell up to $30,000,000 of common stock over a 36-month period (described in Note 10). Pursuant to the purchase agreement, the Company received $1,486,983 during the period from January 1 through March 18, 2025 and the remaining available amount of $0 is available to the Company per the agreement. On December 9, 2022, the Company entered into a sales agreement with an investment banking company whereby the Company may offer and sell shares of its common stock having an aggregate offering price of up to $35,000,000 from time to time through or to the investment banking company, as sales agent or principal (described in Note 10). Pursuant to the sales agreement, the Company received $116,435 during the period from January 1 through March 18, 2025 and the remaining available amount of $31,482,032 is available to the Company per the agreement. The Company's first commercial agreement occurred in May 2023 from a material supply and license agreement that incorporates the Company's patented electro-optic polymer materials for use in manufacturing photonic devices (described in Note 3). For the year ended December 31, 2024, the Company recognized $81,855 in revenue related to this agreement. The Company's cash requirements are expected to increase at a rate consistent with the Company's path to revenue as it expands its activities and operations with the objective of increasing its revenue stream from commercialization of its electro-optic polymer technology. The Company currently has no debt to service.

NOTE 3 – REVENUE

The Company's first commercial agreement occurred in May 2023, in the form of a four-year material supply and license agreement (the "License Agreement") that incorporates the Company's patented electro-optic polymer materials for use in manufacturing of photonic devices (the "Licensed Product"). The licensee shall pay the Company a running royalty with a minimum royalty paid on an annual basis over the term of the License Agreement the minimum royalty payments and milestone license fees. The License Agreement is a non-exclusive material supply and license agreement.

NOTE 3 – REVENUE (CONTINUED)

Additional future revenue will be generated from royalties from the licensee's sale of Licensed Product that exceed the minimum royalty payments and milestone license fees.

During 2024, the Company also performed device processing work for a customer.

Timing of Revenue Recognition and Contract Balances
Revenues related to the initial license fee and a minimum annual royalty are recognized over time commencing with the License Agreement in May 2023. An up-front license fee in the amount of $50,000 was paid during the period ended December 31, 2023. $23,208 and $39,875 of this amount is recorded as a contract liability in current liabilities on the Company's balance sheets as of December 31, 2024 and December 31, 2023, respectively. For the years ended December 31, 2024 and December 31, 2023, the Company recognized $81,855 and $40,502 in revenue related to this agreement.

In March 2024, the Company completed device processing work on the devices supplied by a customer. Revenue for this contract was recognized at the time of shipment of the devices back to the customer and amounted to $13,750 for the year ended December 31, 2024.

Contract balances are as follows:

	December 31, 2024	December 31, 2023
Accounts receivable, net	$ 45,565	$ 30,376
Short-term contract assets	$ —	$ —
Long-term contract assets	$ —	$ —
Short-term contract liability	$ 23,208	$ 39,875

Significant changes in the contract balances for the years ended December 31, 2024 are as follows:

	Year Ended December 31, 2024	
	Assets	Liabilities
Balance at December 31, 2023	$ 30,376	$ (39,875)
Revenue recognized that was previously included in contract liability	—	16,667
Decreases/increases due to cash received	(63,884)	—
Billed receivables recorded	109,449	—
Transferred to receivables from unbilled receivables	(95,564)	—
Unbilled receivables recorded	65,188	—
Balance at December 31, 2024	$ 45,565	$ (23,208)

A rollforward of contract balances is not disclosed for the year ended December 31, 2023 since there were no contracts as of December 31, 2022.

Assets Recognized for the Costs to Obtain a Contract
There are no assets recognized for the costs to obtain the License Agreement.

NOTE 4 – PREPAID EXPENSES AND OTHER CURRENT ASSETS

Prepaid expenses and other current assets consist of the following:

	December 31, 2024	December 31, 2023
Insurance	$ 154,945	$ 237,791
License	151,451	241,936
Prototype devices	44,134	161,267
Rent	36,525	36,525
Other	9,415	53,373
Investor relations	5,271	6,313
Materials fabrication	—	475,936
Deposit for equipment	—	20,000
Lease incentive receivable	—	4,480
	$ 401,741	$ 1,237,621

NOTE 5 – LOAN RECEIVABLE

On September 7, 2022, the Company entered into a convertible loan agreement (the "Loan") with an entity and issued a loan on September 12, 2022 in the amount of EUR 600,000 bearing interest at 7% per annum with a maturity date of March 31, 2023. The Company recorded $13,375 of interest income for the year ended December 31, 2022. The exchange rates used for the conversion of the EUR denominated loan were the December 31, 2022 reporting period end date exchange rate for the loan principal resulting in a balance of $642,120 and interest receivable resulting in a balance of $13,669 and the average exchange rate for the period ended December 31, 2022 for interest income. The loan and interest were repaid in February and March 2023. The Company recorded $11,125 of interest income for the period ended December 31, 2023 and used the average exchange rate for the conversion of the EUR denominated interest income for the period.

NOTE 6 – PROPERTY AND EQUIPMENT

Property and equipment consist of the following:

	December 31, 2024	December 31, 2023
Office equipment	$ 155,511	$ 146,196
Lab equipment	10,953,487	8,937,847
Furniture	54,493	74,119
Leasehold improvements	432,400	396,111
Software	133,377	111,077
	11,729,268	9,665,350
Less: Accumulated depreciation	6,037,723	4,674,560
	$ 5,691,545	$ 4,990,790

Depreciation expense for the years ended December 31, 2024 and 2023 was $1,563,477 and $1,035,620, respectively. During the year ended December 31, 2024, the Company retired property and equipment with a cost of $203,480 and accumulated depreciation of $200,314 for a loss of $3,166. During the year ended December 31, 2023, the Company disposed of equipment for proceeds of $590, trade-in credit of $216,090 and a gain of $215,509.

NOTE 7 – INTANGIBLE ASSETS

Intangible assets represent legal fees and patent fees associated with the prosecution of patent applications. The Company has recorded amortization expense on patents granted, which are amortized over the remaining legal life. Maintenance patent fees are paid to a government patent authority to maintain a granted patent in force. Some countries require the payment of maintenance fees for pending patent applications. Maintenance fees paid after a patent is granted are expensed, as these are considered ongoing costs to “maintain a patent”. Maintenance fees paid prior to a patent grant date are capitalized to patent costs, as these are considered “patent application costs”. No amortization expense has been recorded on the remaining patent applications since patents on these applications have yet to be granted.

Intangible assets consist of the following:

	December 31, 2024	December 31, 2023
Patents	$ 2,127,076	$ 1,913,751
Less: Accumulated amortization	771,631	659,250
	$ 1,355,445	$ 1,254,501

Amortization expense for the years ended December 31, 2024 and 2023 was $119,283 and $83,521, respectively. During the year ended December 31, 2024, the Company retired certain expired patent applications and patents with a cost of $217,176 and accumulated amortization of $6,902 for a loss of $210,274 included in the statements of comprehensive loss in the (Loss) gain on disposal of property and equipment and intangible assets. There were no patent costs written off for the year ended December 31, 2023.

NOTE 8 – LEASES

On October 30, 2017, the Company entered into a lease agreement (the "Lease") to lease approximately 13,420 square feet of office, chemistry, clean room and research and development space located in Colorado for the Company's principal executive offices and research and development facility. The term of the lease is sixty-one (61) months, beginning on November 1, 2017 and ending on November 30, 2022. In January 2022, the term was extended for an additional twenty-four (24) months.

On November 22, 2022, the Company entered into an amendment to the Lease ("the Amended Lease") to lease an additional approximately 9,684 square feet of adjacent office and warehouse space. The term of the Amended Lease is one hundred twenty (128) months, with an effective date of June 1, 2023. Base rent through January 31, 2024 of the Amended Lease term is approximately $30,517 per month. The base rent for the next full year of the Amended Lease term is approximately $377,288, with an increase in annual base rent of approximately 3% in each subsequent year of the lease term. Commencing on June 1, 2023, monthly installments of base rent and one-twelfth of landlord's estimate of tenant's proportionate share of annual operating expenses shall be due on the first day of each calendar month. The Amended Lease also provides an allowance of up to $43,216 to be used solely for the cost of renovations to the additional lease premises. As of June 1, 2023, the operating lease right-of-use asset and operating lease liability amounted to $2,945,322 and $2,984,058, respectively. As of December 30, 2024, the operating lease right-of-use asset and operating lease liability amounted to $2,645,723 and $2,766,971, respectively.

For purposes of calculating operating lease liability, lease term includes the initial non-cancelable term plus any term under renewal options that are reasonably assured. Any rent escalations, along with rent abatements, are included in the computation of rent expense calculated on a straight-line basis over the lease term. The interest rate implicit in lease contracts is typically not readily determinable and as such the Company uses the appropriate incremental borrowing rate based on information available at the lease commencement date in determining the present value of the lease payments.

Undiscounted future minimum lease payments under the Amended Lease as of December 31, 2024, by year and in aggregate, including the extended term, are as follows:

YEARS ENDED DECEMBER 31,	AMOUNT
2025	387,666
2026	399,199
2027	411,174
2028	423,612
2029	436,300
Thereafter	1,921,271
	3,979,222
Less discounted interest	(1,212,251)
TOTAL	$ 2,766,971

The Company has elected not to recognize right-of-use assets and lease liabilities arising from short-term leases. There are no other material operating leases.

The following table presents weighted average assumptions used to compute the Company's right-of-use assets and lease liabilities:

	December 31, 2024
Weighted average remaining lease term (in years)	9.08
Weighted average discount rate	8.25%

As of December 31, 2024, current operating leases had remaining terms between 13 months and 9 years, with some leases having options to extend the lease terms.

Current lease agreements do not contain any residual value guarantees or material restrictive covenants. As of December 31, 2024, the Company did not have any finance leases.

Operating and short-term lease costs totaling $513,428 and $102,077 are included in research and development and general and administrative expenses for the year ended December 31, 2024. Operating and short-term lease costs totaling $334,051 and $79,083 are included in research and development and general and administrative expenses for the year ended December 31, 2023.

NOTE 9 – INCOME TAXES

As discussed in Note 1, the Company utilizes the asset and liability method of accounting for income taxes in accordance with FASB ASC 740.

The income tax (benefit) provision consists of the following:

	2024	2023
Current	$ —	$ —
Deferred	(4,220,000)	(6,526,000)
Change in valuation allowance	4,220,000	6,526,000
	$ —	$ —

The reconciliation of the statutory federal rate to the Company's effective income tax rate is as follows:

	2024		2023	
	Amount	%	Amount	%
Income tax benefit at U.S. federal income tax rate	$ (4,732,000)	(21)	$ (4,418,000)	(21)
State tax benefit, net of federal tax effect	(763,000)	(3)	(957,000)	(5)
Federal deduction net of tax	—	—	44,000	—
Non-deductible share-based compensation	—	—	1,653,000	8
Exercised share based compensation	(280,000)	(1)	(2,850,000)	(13)
Other	1,555,000	6	2,000	—
Change in valuation allowance	4,220,000	19	6,526,000	31
	$ —	—	$ —	—

The components of deferred tax assets as of December 31, 2024 and 2023 are as follows:

	2024	2023
Deferred tax asset for NOL carryforwards	$ 29,737,000	$ 29,018,000
Share-based compensation	4,901,000	3,889,000
Section 174 research and development expenses	4,932,000	—
Section 481(a) adjustment	(2,264,000)	—
Other	(281,000)	(102,000)
Valuation allowance	(37,025,000)	(32,805,000)
	$ —	$ —

The valuation allowance for deferred tax assets as of December 31, 2024 and 2023 was $37,025,000 and $32,805,000, respectively. The change in the total valuation for the year ended December 31, 2024 was an increase of $4,220,000, and for the year ended December 31, 2023 was an increase of $6,526,000. In assessing the realization of deferred tax assets, management considers whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which the net operating losses and temporary differences become deductible. Management considered projected future taxable income and tax planning strategies in making this assessment. The value of the deferred tax assets was offset by a valuation allowance, due to the current uncertainty of the future realization of the deferred tax assets.

NOTE 9 – INCOME TAXES (CONTINUED)

As of December 31, 2024, the Company had net operating loss carry forwards of approximately $121,349,000, comprised of net operating losses in the amount of approximately $36,485,000 recorded in tax years beginning prior to January 1, 2018 expiring through the year ending December 31, 2038 and net operating losses recorded in tax years beginning January 1, 2018 and after in the amount of approximately $84,864,000 which are allowed for an indefinite carryforward period but may be subject to limitations. This amount can be used to offset future taxable income of the Company.

The timing and manner in which the Company can utilize operating loss carryforwards in any year may be limited by provisions of the Internal Revenue Code regarding changes in ownership of corporations. Such limitation may have an impact on the ultimate realization of its carryforwards and future tax deductions.

The Company follows ASC 740-10, which provides guidance for the recognition and measurement of certain tax positions in an enterprise's financial statements. Recognition involves a determination of whether it is more likely than not that a tax position will be sustained upon examination with the presumption that the tax position will be examined by the appropriate taxing authority having full knowledge of all relevant information. The adoption of ASC 740-10 did not require an adjustment to the Company's financial statements.

The Company's policy is to record interest and penalties associated with unrecognized tax benefits as additional income taxes in the statement of operations. As of January 1, 2024, the Company had no unrecognized tax benefits and no charge during 2024, and accordingly, the Company did not recognize any interest or penalties during 2024 related to unrecognized tax benefits. There is no accrual for uncertain tax positions as of December 31, 2024.

The Company files U.S. income tax returns and a state income tax return. With few exceptions, the U.S. and state income tax returns filed for the tax years ended on December 31, 2021 and thereafter are subject to examination by the relevant taxing authorities.

NOTE 10 – STOCKHOLDERS' EQUITY

Preferred Stock
Pursuant to the Company's Articles of Incorporation, the Company's board of directors is empowered, without stockholder approval, to issue series of preferred stock with any designations, rights and preferences as they may from time to time determine. The rights and preferences of this preferred stock may be superior to the rights and preferences of the Company's common stock; consequently, preferred stock, if issued could have dividend, liquidation, conversion, voting or other rights that could adversely affect the voting power or other rights of the common stock. Additionally, preferred stock, if issued, could be utilized, under special circumstances, as a method of discouraging, delaying or preventing a change in control of the Company's business or a takeover from a third party.

Common Stock
On July 2, 2021, the Company filed a $100,000,000 universal shelf registration statement with the U.S. Securities and Exchange Commission which became effective on July 9, 2021 and expired on July 8, 2024.

On July 26, 2024, the Company filed a new $100,000,000 universal shelf registration statement with the U.S. Securities and Exchange Commission which became effective on August 5, 2024.

NOTE 10 – STOCKHOLDERS' EQUITY (CONTINUED)

Common Stock (Continued)

On October 4, 2021, the Company entered into a purchase agreement with an institutional investor to sell up to $33,000,000 of common stock over a 36-month period. Concurrently with entering into the purchase agreement, the Company also entered into a registration rights agreement which provides the institutional investor with certain registration rights related to the shares issued under the purchase agreement. Pursuant to the purchase agreement, the Company issued 30,312 shares of common stock to the institutional investor as an initial commitment fee valued at $279,174, fair value, and 60,623 shares of common stock are reserved for additional commitment fees to the institutional investor in accordance with the terms of the purchase agreement. During the period October 4, 2021 through December 31, 2023, the institutional investor purchased 3,632,456 shares of common stock for proceeds of $33,000,000 and the Company issued 60,623 shares of common stock as additional commitment fee, valued at $694,531 fair value. During the year ended December 31, 2023, pursuant to the purchase agreement, the institutional investor purchased 779,945 shares of common stock for proceeds of $3,847,307 and the Company issued 7,069 shares of common stock as additional commitment fee, valued at $38,161 fair value. All of the registered shares under the purchase agreement have been issued as of December 31, 2023.

On February 28, 2023, the Company entered into a purchase agreement with an institutional investor to sell up to $30,000,000 of common stock over a 36-month period. Concurrently with entering into the purchase agreement, the Company also entered into a registration rights agreement which provides the institutional investor with certain registration rights related to the shares issued under the purchase agreement. Pursuant to the purchase agreement, the Company issued 50,891 shares of common stock to the institutional investor as an initial commitment fee valued at $279,391, fair value, and 101,781 shares of common stock are reserved for additional commitment fees to the institutional investor in accordance with the terms of the purchase agreement. During the period February 28, 2023 through December 31, 2024, the institutional investor purchased 6,720,455 shares of common stock for proceeds of $28,513,017 and the Company issued 96,735 shares of common stock as additional commitment fee, valued at $510,236 fair value, leaving 5,046 in reserve for additional commitment fees. During the year ended December 31, 2024, pursuant to the purchase agreement, the institutional investor purchased 3,850,000 shares of common stock for proceeds of $12,366,965, and the Company issued 41,956 shares of common stock as additional commitment fee, valued $154,210 fair value. During the period February 28, 2023 through December 31, 2023, the institutional investor purchased 2,870,455 shares of common stock for proceeds of $16,146,052 and the Company issued 54,779 shares of common stock as additional commitment fee, valued at $356,026 fair value. During the period from January 1, 2025 through March 18, 2025, pursuant to the purchase agreement, the institutional investor purchased 1,035,881 shares of common stock for proceeds of $1,486,983 and the Company issued 5,046 shares of common stock as additional commitment fee, valued at $8,029 fair value, leaving zero in reserve for additional commitment fees.

On December 9, 2022, the Company entered into a sales agreement with an investment banking company. In accordance with the terms of this sales agreement, the Company may offer and sell shares of its common stock having an aggregate offering price of up to $35,000,000 from time to time through or to the investment banking company, as sales agent or principal. Sales of shares of the Company's common stock, if any, may be made by any method deemed to be an "at the market offering". The sales agent is entitled to compensation under the terms of the sales agreement at a commission rate equal to 3% of the gross proceeds of the sales price of common stock that they sell.

NOTE 11 – STOCK BASED COMPENSATION

Common Stock (Continued)
During the year ended December 31, 2024, pursuant to the sales agreement, the investment banking company sold 551,501 shares of the Company's common stock for proceeds of $1,779,976 after a payment of the commission in the amount of $55,054 to the investment banking company. During the year ended December 31, 2023, pursuant to the sales agreement, the investment banking company sold 202,115 shares of the Company's common stock for proceeds of $1,515,878 after a payment of the commission in the amount of $46,884 to the investment banking company. During the period from January 1, 2025 through March 18, 2025, pursuant to the sales agreement, the investment banking company sold 50,000 shares of the Company's common stock for proceeds of $116,435 after a payment of the commission in the amount of $3,601 to the investment banking company.

Common Stock Options and Warrants
During 2007, the Board of Directors of the Company adopted the 2007 Employee Stock Plan ("2007 Plan") that was approved by the shareholders. Under the 2007 Plan, the Company is authorized to grant options to purchase up to 10,000,000 shares of common stock to directors, officers, employees and consultants who provide services to the Company. The 2007 Plan is intended to permit stock options granted to employees under the 2007 Plan to qualify as incentive stock options under Section 422 of the Internal Revenue Code of 1986, as amended ("Incentive Stock Options"). All options granted under the 2007 Plan, which are not intended to qualify as Incentive Stock Options are deemed to be non-qualified options ("Non-Statutory Stock Options").

Effective June 24, 2016, the 2007 Plan was terminated. As of December 31, 2024, options to purchase 2,053,000 shares of common stock have been issued and are outstanding.

During 2016, the Board of Directors of the Company adopted the 2016 Plan that was approved by the shareholders at the 2016 annual meeting of shareholders on May 20, 2016. Under the 2016 Plan, the Company is authorized to grant awards of incentive and non-qualified stock options and restricted stock to purchase up to 3,000,000 shares of common stock to employees, directors and consultants. Effective May 16, 2019, the number of shares of the Company's common stock available for issuance under the 2016 Plan was increased from 3,000,000 to 8,000,000 shares. Effective May 25, 2023, the number of shares of the Company's common stock available for issuance under the 2016 Plan was increased from 8,000,000 to 13,000,000 shares and awards of restricted stock units are authorized for issuance. As of December 31, 2024, options to purchase 7,446,859 shares of common stock have been issued and are outstanding and 356,061 restricted shares of common stock have been granted. As of December 31, 2024, 3,480,845 shares of common stock remain available for grants under the 2016 Plan.

NOTE 11 – STOCK BASED COMPENSATION (CONTINUED)

Common Stock Options and Warrants (Continued)
Both plans are administered by the Company's Board of Directors or its compensation committee which determines the persons to whom awards will be granted, the number of awards to be granted, and the specific terms of each grant. Subject to the provisions regarding Ten Percent Shareholders, (as defined in the 2016 Plan), the exercise price per share of each option cannot be less than 100% of the fair market value of a share of common stock on the date of grant. Options granted under the 2016 Plan are generally exercisable for a period of 10 years from the date of grant and may vest on the grant date, another specified date or over a period of time.

The Company uses the Black-Scholes option pricing model to calculate the grant-date fair value of an award, with the following assumptions for 2024: no dividend yield, expected volatility, based on the Company's historical volatility, 76.3% to 78.5%, risk-free interest rate between 3.73% to 4.47% and expected option life of 10 years, which is based on the legal contractual life of the options.

The Black-Scholes option pricing model assumptions for 2023 are as follows: no dividend yield, expected volatility, based on the Company's historical volatility, 73.7% to 77.2%, risk-free interest rate between 3.37% to 4.82% and expected option life of 10 years.

As of December 31, 2024, there was $2,755,783 of unrecognized compensation expense related to non-vested market-based share awards that is expected to be recognized through December 2027. As of December 31, 2023, there was $3,295,335 of unrecognized compensation expense related to non-vested market-based share awards.

Share-based compensation was recognized as follows:

	2024	2023
2007 Employee Stock Option Plan	$ —	$ —
2016 Equity Incentive Plan	4,440,003	6,459,387
2016 Equity Incentive Plan restricted stock awards	446,628	262,697
Warrants	—	—
Total share-based compensation	$ 4,886,631	$ 6,722,084

NOTE 11 – STOCK BASED COMPENSATION (CONTINUED)

Common Stock Options and Warrants (Continued)

The following tables summarize all stock option and warrant activity of the Company during the years ended December 31, 2024 and 2023:

	Non-Qualified Stock Options and Warrants Outstanding and Exercisable		
	Number of Shares	Exercise Price	Weighted Average Exercise Price
Outstanding, December 31, 2022	8,073,173	$0.51 - $16.81	$ 1.91
Granted	1,959,667	$4.28 - $7.67	$ 5.24
Forfeited	(39,625)	$6.25 - $8.93	$ 7.12
Exercised	(1,183,408)	$0.67 - $5.22	$ 0.86
Outstanding, December 31, 2023	8,809,807	$0.51 - $16.81	$ 2.76
Granted	1,628,000	$1.96 - $5.00	$ 4.05
Forfeited	(43,948)	$4.28 - $7.67	$ 5.70
Exercised	(494,000)	$0.57 - $1.15	$ 0.68
Outstanding, December 31, 2024	9,899,859	$0.51 - $16.81	$ 3.07
Exercisable, December 31, 2024	8,848,908	$0.51 - $16.81	$ 3.00

The aggregate intrinsic value of options and warrants outstanding and exercisable as of December 31, 2024 was $6,418,443 and $6,400,033, respectively. The aggregate intrinsic value is calculated as the difference between the exercise price of the underlying options and warrants and the closing stock price of $2.10 for the Company's common stock on December 31, 2024. During the year ending December 31, 2024, 375,000 options with the aggregate intrinsic value of $1,399,958 were exercised for proceeds of $246,100. During the year ending December 31, 2024, 119,000 warrants with the aggregate intrinsic value of $171,550 were exercised for proceeds of $91,250. During the year ending December 31, 2023, 914,408 options with the aggregate intrinsic value of $4,698,996 were exercised for proceeds of $777,674. During the year ending December 31, 2023, 269,000 warrants with the aggregate intrinsic value of $1,162,230 were exercised for proceeds of $236,250.

NOTE 11 – STOCK BASED COMPENSATION (CONTINUED)

Common Stock Options and Warrants (Continued)

Non-Qualified Stock Options and Warrants Outstanding			
Range of Exercise Prices	Number Outstanding Currently Exercisable at December 31, 2024	Weighted Average Remaining Contractual Life	Weighted Average Exercise Price of Options and Warrants Currently Exercisable
$0.51 - $16.81	8,848,908	5.3 Years	$ 3.00

Restricted Stock Awards
On March 16, 2023, the Compensation Committee of the Board of Directors approved grants totaling 99,616 Restricted Stock Awards to the Company's four outside directors. Each RSA had a grant date fair value of $5.22 which shall be amortized on a straight-line basis over the vesting period into director's compensation expenses within the Statement of Comprehensive Loss. Such RSAs were granted under the 2016 Equity Incentive Plan ("2016 Plan") and vest in total 8,338 shares on March 16, 2023, with the remaining vesting in 33 equal monthly installments in total of 2,766 shares beginning April 1, 2023.

On August 1, 2023, the Compensation Committee of the Board of Directors approved a grant totaling 6,238 Restricted Stock Awards to the Company's outside director. Each RSA had a grant date fair value of $6.68 which shall be amortized on a straight-line basis over the vesting period into director's compensation expenses within the Statement of Comprehensive Loss. Such RSA was granted under the 2016 Plan. 218 shares from this grant vested on August 1, with the remaining vesting in 28 equal monthly installments in total of 215 shares beginning September 1, 2023.

On June 18, 2024, the Compensation Committee of the Board of Directors approved grants totaling 92,475 Restricted Stock Awards to the Company's five outside directors. Each RSA had a grant date fair value of $3.33 which shall be amortized on a straight-line basis over the vesting period into director's compensation expenses within the Statement of Comprehensive Loss. Such RSAs were granted under the 2016 Equity Incentive Plan ("2016 Plan") and vested in total 15,455 shares on June 18, 2024, with the remaining vesting in 10 equal quarterly installments in total of 7,702 shares beginning July 1, 2024.

On August 1, 2024, the Compensation Committee of the Board of Directors approved a grant totaling 12,924 Restricted Stock Awards to the Company's outside director. Each RSA had a grant date fair value of $3.16 which shall be amortized on a straight-line basis over the vesting period into director's compensation expenses within the Statement of Comprehensive Loss. Such RSA was granted under the 2016 Equity Incentive Plan ("2016 Plan") and vests in 9 equal quarterly installments of 1,436 shares beginning September 1, 2024.

On September 4, 2024, the Compensation Committee of the Board of Directors approved a grant totaling 11,488 Restricted Stock Awards to the Company's outside director. Each RSA had a grant date fair value of $2.68 which shall be amortized on a straight-line basis over the vesting period into director's compensation expenses within the Statement of Comprehensive Loss. Such RSA was granted under the 2016 Equity Incentive Plan ("2016 Plan") and vests in 8 equal quarterly installments of 1,436 shares beginning October 1, 2024.

NOTE 11 – STOCK BASED COMPENSATION (CONTINUED)

Restricted Stock Awards (Continued)
On December 10, 2024, the Compensation Committee of the Board of Directors approved a grant totaling 110,000 Restricted Stock Awards to the two Company's executives and an outside director for consulting services. Each RSA had a grant date fair value of $2.65 which shall be amortized on a straight-line basis over the vesting period into stock-based compensation expenses within the Statement of Comprehensive Loss. The RSAs were granted under the 2016 Equity Incentive Plan ("2016 Plan") and cliff vest on March 10, 2025 for an outside director and on June 10, 2025 for the executives.

Upon the occurrence of a Change in Control, 100% of the unvested Restricted Stock shall vest as of the date of the Change in Control. Upon vesting, the restrictions on the shares lapse.

The fair value of restricted stock awards is estimated by the market price of the Company's common stock at the date of grant. Restricted stock activity during the year ending December 31, 2024 and 2023 are as follows:

	Restricted Stock Awards			
	Year Ended			
	December 31, 2024		December 31, 2023	
	Number of Shares	Weighted Average Grant Date Fair Value per Share	Number of Shares	Weighted Average Grant Date Fair Value per Share
Non-vested, beginning of period	78,452	$ 5.71	13,816	$ 9.65
Granted	226,887	2.96	105,854	5.31
Vested	(77,847)	4.79	(41,218)	6.00
Cancelled and forfeited	—	—	—	—
Non-vested, end of period	227,492	$ 3.28	78,452	$ 5.71

Restricted stock awards are being amortized to expense over the vesting period. As of December 31, 2024 and 2023, the unamortized value of the restricted stock awards was $656,735 and $432,292, respectively.

NOTE 12 – RELATED PARTY

During the years ended December 31, 2024, and 2023, the Company engaged in transactions with related parties, including consultants, directors, and entities affiliated with members of the Board of Directors. These transactions primarily relate to legal services, consulting fees, director compensation, accounting services, and expense reimbursements.

Related Party Transactions for the Year Ended December 31, 2024

- The Company incurred $90,360 in legal fees with a related party law firm, of which $90,360 remained accrued as of December 31, 2024.
- The Company incurred $207,269 in accounting and IT service fees and expense reimbursements to related parties, with $8,326 accrued as of December 31, 2024.
- The Company incurred $251,194 in fees and travel expenses to directors, with $72,748 accrued as of December 31, 2024.
- The Company incurred $438,716 in consulting fees and travel reimbursements to advisory board members, with $29,345 accrued as of December 31, 2024.

NOTE 12 – RELATED PARTY (CONTINUED)

Related Party Transactions for the Year Ended December 31, 2023:

- The Company incurred $175,737 in legal fees with a related party law firm, of which $115,160 remained accrued as of December 31, 2023.
- The Company incurred $382,910 in accounting and IT service fees and expense reimbursements to related parties, with $102,351 accrued as of December 31, 2023.
- The Company incurred $207,563 in fees and travel expenses to directors, with $62,226 accrued as of December 31, 2023.
- The Company incurred $390,483 in consulting fees and travel reimbursements to advisory board members, with $33,746 accrued as of December 31, 2023.

NOTE 13 – RETIREMENT PLAN

The Company established a 401(k) retirement plan covering all eligible employees beginning November 15, 2013. The plan offers two types of elected deferrals: pre-tax deferrals and Roth deferrals. The Company matches 100% of each participant contribution, up to 4% for all eligible employees. Matching contributions vest immediately. Participants are entitled to receive distributions of all vested amounts beginning at age 59 1/2. Matching contributions to all eligible non-executive participants charged to expense were $134,766 and $72,520 for the years ending December 31, 2024 and 2023, respectively. The plan is subject to the annual IRS elective deferral limit of $23,000 per employee for 2024 and $7,500 catch-up for 50 and over.

NOTE 14 – SEGMENT REPORTING

The Company operates as a single reportable segment, as the Chief Operating Decision Maker ("CODM"), the Chief Executive Officer ("CEO"), evaluates the business on a consolidated basis and does not receive discrete financial information for multiple business units.

Measure of Segment Profit or Loss

The CODM assesses the Company's financial performance based on operating loss, which aligns with the amount reported in the statements of comprehensive loss. The following table presents a reconciliation of segment operating loss to net loss:

	2024	2023
NET SALES	$ 95,605	$ 40,502
COST OF SALES	7,395	2,513
GROSS PROFIT	88,210	37,989
OPERATING EXPENSES		
Research and development	16,806,548	15,903,689
General and administrative	6,370,805	5,359,565
	23,177,353	21,263,254
SEGMENT OPERATING LOSS	(23,089,143)	(21,225,265)
OTHER INCOME (EXPENSE)		
Interest income	926,854	657,546
Commitment fee	(154,210)	(673,578)
(Loss) gain on disposal of property and equipment and intangible assets	(213,440)	215,509
Other (expense)	(5,102)	(12,244)
NET LOSS	$ (22,535,041)	$ (21,038,032)

Significant Segment Expenses

The Company considers the following as significant expenses in evaluating its segment performance:

- Research and Development: includes costs related to personnel, laboratory and wafer fabrication materials and supplies, prototype device development and wafer fabrication expenses, and third-party consulting costs aimed at developing high-performance electro-optic polymer materials.
- General and Administrative: includes personnel costs, professional fees, and other overhead expenses.
- Cost of Sales: represents labor costs, material costs and manufacturing overhead costs associated with the production of materials transferred to the customer under the technology license and material supply agreement at the Company's facility.

Since the Company has only one reportable segment, no additional segment disclosures are required beyond entity-wide disclosures presented below.

Entity-Wide Disclosures

- Geographic Revenue Information: For the year ended December 31, 2024, 14% of the Company's net sales were generated in the United States and 86% internationally. For the year ended December 31, 2023, 100% of the Company's net sales were generated internationally.
- Major Customers: The Company has one customer that accounted for 10% or more of total revenue.

Chief Operating Decision Maker (CODM)

The CODM of the Company is the Chief Executive Officer (CEO), who is responsible for evaluating financial results and making resource allocation decisions.

NOTE 15 – SUBSEQUENT EVENTS

On March 17, 2025, the Company entered into a purchase agreement with an institutional investor to sell up to $30,000,000 of common stock over a 36-month period. Concurrently with entering into the purchase agreement, the Company also entered into a registration rights agreement which provides the institutional investor with certain registration rights related to the shares issued under the purchase agreement.

EXHIBIT 4.1

DESCRIPTION OF THE REGISTRANT'S SECURITIES REGISTERED PURSUANT TO SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934

Lightwave Logic, Inc. (the "Company" or "we" or "our") has one class of securities registered under Section 12 of the Securities Exchange Act of 1934, our common stock, par value $0.001 per share (the "common stock").

Description of Common Stock

The following description of our common stock is a summary and does not purport to be complete. It is subject to and qualified in its entirety by reference to our Articles of Incorporation, as amended (the "articles of incorporation") and our Amended and Restated Bylaws (the "bylaws"), each of which are incorporated by reference as an exhibit to the Annual Report on Form 10-K of which this exhibit is a part. We encourage you to read our articles of incorporation, our bylaws and the applicable provisions of the Nevada Revised Statutes for additional information.

Authorized Share Capital. The Company's authorized capital stock consists of 250,000,000 shares of common stock, par value $0.001 per share and 1,000,000 shares of preferred stock, par value $0.001 per share.

Voting. Each outstanding share of common stock is entitled to one vote on all matters to be submitted to a vote of the shareholders. Holders do not have preemptive rights, so we may issue additional shares that may reduce each holder's voting and financial interest in our Company. Cumulative voting does not apply to the election of directors, so holders of more than 50% of the shares voted for the election of directors can elect all of the directors. All elections for directors shall be decided by a plurality vote; all other questions shall be decided by majority vote except as otherwise provided by Nevada Revised Statutes. Our bylaws permit the holders of the same percentage of all shareholders entitled to vote at a meeting to take action by written consent without a meeting.

Dividend Rights. Holders of common stock are entitled to receive dividends when, as and if declared by the board of directors out of funds legally available therefor.

Liquidation Preferences. In the event of liquidation, dissolution or winding up of our Company, holders of common stock are entitled to share ratably in all assets remaining available for distribution to them after payment of liabilities and after provision has been made for each class of stock, if any, having preference over the common stock.

Other Terms. Holders of common stock do not have any conversion, redemption provisions or other subscription rights. All of the outstanding shares of common stock are fully paid and non-assessable.

Anti-Takeover Provisions

Certain of our charter, statutory and contractual provisions could make the removal of our management and directors more difficult and may discourage transactions that otherwise could involve payment of a premium over prevailing market prices for our common stock. Furthermore, the existence of the foregoing provisions could lower the price that investors might be willing to pay in the future for shares of our common stock. They could also deter potential acquirers of our Company, thereby reducing the likelihood that you could receive a premium for your common stock in an acquisition.

Charter and Bylaw Provisions

Our articles of incorporation and bylaws contain the following provisions that may have the effect of discouraging unsolicited acquisition proposals:

- authorize our board of directors to create and issue, without stockholder approval, preferred stock, thereby increasing the number of outstanding shares, which can deter or prevent a takeover attempt;
- prohibit cumulative voting in the election of directors, which would otherwise allow less than a majority of stockholders to elect director candidates;
- empower our board of directors to fill any vacancy on our board of directors, whether such vacancy occurs as a result of an increase in the number of directors or otherwise;
- provide that our board of directors be divided into three classes, with approximately one-third of the directors to be elected each year;
- provide that special meetings of our stockholders may only be called by the chairperson, president or chief executive officer, or by resolution of the board of directors or at the request in writing of stockholders owning 66 2/3% in amount of the entire capital stock of the Company issued and outstanding and entitled to vote;
- establish advance notice procedures with regard to stockholder proposals relating to stockholder nominees for director and other stockholder proposals;
- provide that our board of directors is expressly authorized to adopt, amend or repeal our bylaws; and
- provide that our directors will be elected by a plurality of the votes cast in the election of directors.

These provisions could lower the price that future investors might be willing to pay for shares of our common stock.

Nevada Law

Nevada Revised Statutes sections 78.378 to 78.3793 provide state regulation over the acquisition of a controlling interest in certain Nevada corporations unless the articles of incorporation or bylaws of the corporation provide that the provisions of these sections do not apply. Our articles of incorporation and bylaws do not state that these provisions do not apply. The statute creates a number of restrictions on the ability of a person or entity to acquire control of a Nevada company by setting down certain rules of conduct and voting restrictions in any acquisition attempt, among other things. The statute contains certain limitations and it may not apply to our Company. These provisions may have the effect of deterring hostile takeovers or delaying changes in control, which could depress the market price of our common stock and deprive shareholders of opportunities to realize a premium on shares of common stock held by them.

Contractual Provisions

Our employee stock option agreements include change-in-control provisions that allow us to grant options or stock purchase rights that may become vested immediately upon a change in control. The terms of change of control provisions contained in certain of our senior executive employee agreements may also discourage a change in control of our Company.

Our board of directors also has the power to adopt a shareholder rights plan that could delay or prevent a change in control of our Company even if the change in control is generally beneficial to our shareholders. These plans, sometimes called “poison pills,” are oftentimes criticized by institutional investors or their advisors and could affect our rating by such investors or advisors. If our board of directors adopts such a plan, it might have the effect of reducing the price that new investors are willing to pay for shares of our common stock.

Together, these charter, statutory and contractual provisions could make the removal of our management and directors more difficult and may discourage transactions that otherwise could involve payment of a premium over prevailing market prices for our common stock. Furthermore, the existence of the foregoing provisions, could limit the price that investors might be willing to pay in the future for shares of our common stock. They could also deter potential acquirers of our Company, thereby reducing the likelihood that you could receive a premium for your common stock in an acquisition.

Listing

Our common stock is listed on the NASDAQ Capital Market under the symbol "LWLG."

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Broadridge.

Preferred Stock

Our common stock is subject to the express terms of the Company’s preferred stock and any series thereof. The board of directors may issue preferred stock with voting, dividend, liquidation and other rights that could adversely affect the relative rights of the holders of the common stock.

PURCHASE AGREEMENT

THIS PURCHASE AGREEMENT (the "Agreement"), dated as of March 17, 2025 is made by and between **LIGHTWAVE LOGIC, INC.,** a Nevada corporation (the "Company"), and **LINCOLN PARK CAPITAL FUND, LLC**, an Illinois limited liability company (the "Investor").

WHEREAS:

Subject to the terms and conditions set forth in this Agreement, the Company wishes to sell to the Investor, and the Investor wishes to buy from the Company, up to Thirty Million Dollars ($30,000,000) of the Company's common stock, $0.001 par value per share (the "Common Stock"). The shares of Common Stock to be purchased hereunder are referred to herein as the "Purchase Shares."

NOW THEREFORE, in consideration of the mutual covenants contained in this Agreement, and for other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, the Company and the Investor hereby agree as follows:

1. CERTAIN DEFINITIONS.

For purposes of this Agreement, the following terms shall have the following meanings:

(a) "Accelerated Purchase Date" means, with respect to any Accelerated Purchase made pursuant to Section 2(b) hereof, the Business Day immediately following the applicable Purchase Date with respect to the corresponding Regular Purchase referred to in Section 2(a) hereof.

(b) "Accelerated Purchase Minimum Price Threshold" means, with respect to any Accelerated Purchase made pursuant to Section 2(b) hereof, any minimum per share price threshold set forth by the Company in the applicable Accelerated Purchase Notice.

(c) "Accelerated Purchase Notice" means, with respect to an Accelerated Purchase made pursuant to Section 2(b) hereof, an irrevocable written notice from the Company to the Investor directing the Investor to purchase the applicable Accelerated Purchase Share Amount at the Accelerated Purchase Price on the Accelerated Purchase Date for such Accelerated Purchase in accordance with this Agreement, and specifying any Additional Accelerated Purchase Minimum Price Threshold determined by the Company.

(d) "Accelerated Purchase Price" means, with respect to an Accelerated Purchase made pursuant to Section 2(b) hereof, the lower of (i) ninety-six and one half percent (96.5%) of the VWAP for the period beginning at 9:30:01 a.m., Eastern time, on the applicable Accelerated Purchase Date, or such other time publicly announced by the Principal Market as the official open (or commencement) of trading on the Principal Market on such applicable Accelerated Purchase Date (the "Accelerated Purchase Commencement Time"), and ending at the earliest of (A) 4:00:00 p.m., Eastern time, on such applicable Accelerated Purchase Date, or such other time publicly announced by the Principal Market as the official close of trading on the Principal Market on such applicable Accelerated Purchase Date, (B) such time, from and after the Accelerated Purchase Commencement Time for such Accelerated Purchase, that the total number (or volume) of shares of Common Stock traded on the Principal Market has exceeded the applicable Accelerated Purchase Share Volume Maximum, and (C) such time, from and after the Accelerated Purchase Commencement Time for such Accelerated Purchase, that the Sale Price has fallen below the applicable Accelerated Purchase Minimum Price Threshold (such earliest of (i)(A), (i)(B) and (i)(C) above, the "Accelerated Purchase Termination Time"), and (ii) the Closing Sale Price of the Common Stock on such applicable Accelerated Purchase Date (to be appropriately adjusted for any reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction).

(e) "Accelerated Purchase Share Amount" means, with respect to an Accelerated Purchase made pursuant to Section 2(b) hereof, the number of Purchase Shares directed by the Company to be purchased by the Investor in an Accelerated Purchase Notice, which number of Purchase Shares shall not exceed the lesser of (i) 300% of the number of Purchase Shares directed by the Company to be purchased by the Investor pursuant to the corresponding Regular Purchase Notice for the corresponding Regular Purchase referred to in Section 2(b) hereof (subject to the Purchase Share limitations contained in Section 2(a) hereof) and (ii) an amount equal to (A) the Accelerated Purchase Share Percentage multiplied by (B) the total number (or volume) of shares of Common Stock traded on the Principal Market during the period on the applicable Accelerated Purchase Date beginning at the Accelerated Purchase Commencement Time for such Accelerated Purchase and ending at the Accelerated Purchase Termination Time for such Accelerated Purchase.

(f) "Accelerated Purchase Share Percentage" means, with respect to an Accelerated Purchase made pursuant to Section 2(b) hereof, thirty percent (30%).

(g) "Accelerated Purchase Share Volume Maximum" means, with respect to an Accelerated Purchase made pursuant to Section 2(b) hereof, a number of shares of Common Stock equal to (i) the applicable Accelerated Purchase Share Amount properly directed by the Company to be purchased by the Investor in the applicable Accelerated Purchase Notice for such Accelerated Purchase, divided by (ii) the Accelerated Purchase Share Percentage (to be appropriately adjusted for any reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction).

(h) "Additional Accelerated Purchase Date" means, with respect to an Additional Accelerated Purchase made pursuant to Section 2(c) hereof, the Business Day (i) that is the Accelerated Purchase Date with respect to the corresponding Accelerated Purchase referred to in Section 2(b) hereof and (ii) on which the Investor receives, prior to 1:00 p.m., Eastern time, on such Business Day, a valid Additional Accelerated Purchase Notice for such Additional Accelerated Purchase in accordance with this Agreement.

(i) "Additional Accelerated Purchase Minimum Price Threshold" means, with respect to an Additional Accelerated Purchase made pursuant to Section 2(c) hereof, any minimum per share price threshold set forth by the Company in the applicable Additional Accelerated Purchase Notice.

(j) "Additional Accelerated Purchase Notice" means, with respect to an Additional Accelerated Purchase made pursuant to Section 2(c) hereof, an irrevocable written notice from the Company to the Investor directing the Investor to purchase the applicable Additional Accelerated Purchase Share Amount at the Additional Accelerated Purchase Price for such Additional Accelerated Purchase in accordance with this Agreement, and specifying any Additional Accelerated Purchase Minimum Price Threshold determined by the Company.

(k) "Additional Accelerated Purchase Price" means, with respect to an Additional Accelerated Purchase made pursuant to Section 2(c) hereof, the lower of (i) ninety-six and one half percent (96.5%) of the VWAP for the period on the applicable Additional Accelerated Purchase Date, beginning at the latest of (A) the applicable Accelerated Purchase Termination Time with respect to the corresponding Accelerated Purchase referred to in Section 2(c) hereof on such Additional Accelerated Purchase Date, (B) the applicable Additional Accelerated Purchase Termination Time with respect to the most recently completed prior Additional Accelerated Purchase on such Additional Accelerated Purchase Date, as applicable, and (C) the time at which all Purchase Shares subject to all prior Accelerated Purchases and Additional Accelerated Purchases (as applicable), including, without limitation, those that have been effected on the same Business Day as the applicable Additional Accelerated Purchase Date with respect to which the applicable Additional Accelerated Purchase relates, have theretofore been received by the Investor as DWAC Shares in accordance with this Agreement (such latest of (i)(A), (i)(B) and (i)(C) above, the "Additional Accelerated Purchase Commencement Time"), and ending at the earliest of (X) 4:00 p.m., Eastern time, on such Additional Accelerated Purchase Date, or such other time publicly announced by the Principal Market as the official close of trading on the Principal Market on such Additional Accelerated Purchase Date, (Y) such time, from and after the Additional Accelerated Purchase Commencement Time for such Additional Accelerated Purchase, that the total number (or volume) of shares of Common Stock traded on the Principal Market has exceeded the applicable Additional Accelerated Purchase Share Volume Maximum, and (Z) such time, from and after the Additional Accelerated Purchase Commencement Time for such Additional Accelerated Purchase, that the Sale Price has fallen below the applicable Additional Accelerated Purchase Minimum Price Threshold (such earliest of (i)(X), (i)(Y) and (i)(Z) above, the "Additional Accelerated Purchase Termination Time"), and (ii) the Closing Sale Price of the Common Stock on such Additional Accelerated Purchase Date (to be appropriately adjusted for any reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction).

(l) "Additional Accelerated Purchase Share Amount" means, with respect to an Additional Accelerated Purchase made pursuant to Section 2(c) hereof, the number of Purchase Shares directed by the Company to be purchased by the Investor on an Additional Accelerated Purchase Notice, which number of Purchase Shares shall not exceed the lesser of (i) 300% of the number of Purchase Shares directed by the Company to be purchased by the Investor pursuant to the corresponding Regular Purchase Notice for the corresponding Regular Purchase referred to in Section 2(a) hereof (subject to the Purchase Share limitations contained in Section 2(a) hereof) and (ii) an amount equal to (A) the Additional Accelerated Purchase Share Percentage multiplied by (B) the total number (or volume) of shares of Common Stock traded on the Principal Market during the period on the applicable Additional Accelerated Purchase Date beginning at the Additional Accelerated Purchase Commencement Time for such Additional Accelerated Purchase and ending at the Additional Accelerated Purchase Termination Time for such Additional Accelerated Purchase.

(m) "Additional Accelerated Purchase Share Percentage" means, with respect to an Additional Accelerated Purchase made pursuant to Section 2(c) hereof, thirty percent (30%).

(n) "Additional Accelerated Purchase Share Volume Maximum" means, with respect to an Additional Accelerated Purchase made pursuant to Section 2(c) hereof, a number of shares of Common Stock equal to (i) the applicable Additional Accelerated Purchase Share Amount properly directed by the Company to be purchased by the Investor in the applicable Additional Accelerated Purchase Notice for such Additional Accelerated Purchase, divided by (ii) the Additional Accelerated Purchase Share Percentage (to be appropriately adjusted for any reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction).

(o) "Alternate Adjusted Regular Purchase Share Limit" means, with respect to a Regular Purchase made pursuant to Section 2(a) hereof, the maximum number of Purchase Shares which, taking into account the applicable per share Purchase Price therefor calculated in accordance with this Agreement, would enable the Company to deliver to the Investor, on the applicable Purchase Date for such Regular Purchase, a Regular Purchase Notice for a Purchase Amount equal to, or as closely approximating without exceeding, One Hundred Thousand Dollars ($100,000).

(p) "Available Amount" means, initially, Thirty Million Dollars ($30,000,000) in the aggregate, which amount shall be reduced by the Purchase Amount each time the Investor purchases shares of Common Stock pursuant to Section 2 hereof.

(q) "Bankruptcy Law" means Title 11, U.S. Code, or any similar federal or state law for the relief of debtors.

(r) "Base Prospectus" means the Company's final base prospectus, dated August 5, 2024, as amended, as updated on August 9, 2024, including the documents incorporated by reference therein.

(s) "Business Day" means any day on which the Principal Market is open for trading, including any day on which the Principal Market is open for trading for a period of time less than the customary time.

(t) "Closing Sale Price" means, for any security as of any date, the last closing sale price for such security on the Principal Market as reported by the Principal Market.

(u) "Confidential Information" means any information disclosed by either party to the other party, either directly or indirectly, in writing, orally or by inspection of tangible objects (including, without limitation, documents, prototypes, samples, plant and equipment), which is designated, either orally or in writing, as "Confidential," "Proprietary" or some similar designation. Information communicated orally shall be considered Confidential Information if such information is confirmed in writing as being Confidential Information within ten (10) Business Days after the initial disclosure. Confidential Information may also include information disclosed to a disclosing party by third parties. Confidential Information shall not, however, include any information which (i) was publicly known and made generally available in the public domain prior to the time of disclosure by the disclosing party; (ii) becomes publicly known and made generally available after disclosure by the disclosing party to the receiving party through no action or inaction of the receiving party; (iii) is already in the possession of the receiving party without confidential restriction at the time of disclosure by the disclosing party as shown by the receiving party's files and records immediately prior to the time of disclosure; (iv) is obtained by the receiving party from a third party without a breach of such third party's obligations of confidentiality; (v) is independently developed by the receiving party without use of or reference to the disclosing party's Confidential Information, as shown by documents and other competent evidence in the receiving party's possession; or (vi) is required by law to be disclosed by the receiving party, provided that the receiving party gives the disclosing party prompt written notice of such requirement prior to such disclosure and assistance in obtaining an order protecting the information from public disclosure.

(v) "Custodian" means any receiver, trustee, assignee, liquidator or similar official under any Bankruptcy Law.

(w) "DTC" means The Depository Trust Company, or any successor performing substantially the same function for the Company.

(x) "DWAC Shares" means shares of Common Stock that are (i) issued in electronic form, (ii) freely tradable and transferable and without restriction on resale and (iii) timely credited by the Company, once a DWAC notice is received, to the Investor's or its designee's specified Deposit/Withdrawal at Custodian (DWAC) account with DTC under its Fast Automated Securities Transfer (FAST) Program, or any similar program hereafter adopted by DTC performing substantially the same function.

(y) "Exchange Act" means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

(z) "Fully Adjusted Regular Purchase Share Limit" means, with respect to any reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction from and after the date of this Agreement, the Regular Purchase Share Limit (as defined in Section 2(a) hereof) in effect on the applicable date of determination, after giving effect to the full proportionate adjustment thereto made pursuant to Section 2(a) hereof for or in respect of such reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction.

(aa) "Initial Prospectus Supplement" means the prospectus supplement of the Company relating to the Securities, including the accompanying Base Prospectus, to be prepared and filed by the Company with the SEC pursuant to Rule 424(b)(5) under the Securities Act and in accordance with Section 5(a) hereof, together with all documents and information incorporated therein by reference.

(bb) "Material Adverse Effect" means any material adverse effect on (i) the enforceability of any Transaction Document, (ii) the results of operations, assets, business or financial condition of the Company and its Subsidiaries (as defined below), taken as a whole, other than any material adverse effect that resulted exclusively from (A) any change in the United States or foreign economies or securities or financial markets in general that does not have a disproportionate effect on the Company and its Subsidiaries, taken as a whole, (B) any change that generally affects the industry in which the Company and its Subsidiaries operate that does not have a disproportionate effect on the Company and its Subsidiaries, taken as a whole, (C) any change arising in connection with earthquakes, hostilities, acts of war, sabotage or terrorism or military actions or any escalation or material worsening of any such hostilities, acts of war, sabotage or terrorism or military actions existing as of the date hereof, (D) any action taken by the Investor, its affiliates or its or their successors and assigns with respect to the transactions contemplated by this Agreement, (E) the effect of any change in applicable laws or accounting rules that does not have a disproportionate effect on the Company and its Subsidiaries, taken as a whole, or (F) any change resulting from compliance with terms of this Agreement or the consummation of the transactions contemplated by this Agreement, or (iii) the Company's ability to perform in any material respect on a timely basis its obligations under any Transaction Document to be performed as of the date of determination.

(cc) "Maturity Date" means the first day of the month immediately following the thirty-six (36) month anniversary of the Commencement Date.

(dd) "PEA Period" means the period commencing at 9:30 a.m., Eastern time, on the tenth (10^{th}) Business Day immediately prior to the filing of any post-effective amendment to the Registration Statement (as defined herein) or New Registration Statement (as such term is defined in the Registration Rights Agreement), and ending at 9:30 a.m., Eastern time, on the Business Day immediately following, the effective date of any post-effective amendment to the Registration Statement (as defined herein) or New Registration Statement (as such term is defined in the Registration Rights Agreement).

(ee) "Person" means an individual or entity including but not limited to any limited liability company, a partnership, a joint venture, a corporation, a trust, an unincorporated organization and a government or any department or agency thereof.

(ff) "Principal Market" means The Nasdaq Capital Market (or any nationally recognized successor thereto); provided, however, that in the event the Company's Common Stock is ever listed or traded on The Nasdaq Global Select Market, The Nasdaq Global Market, the New York Stock Exchange, the NYSE American, the NYSE Arca, or the OTCQX or OTCQB operated by the OTC Markets Group, Inc. (or any nationally recognized successor to any of the foregoing), then the "Principal Market" shall mean such other market or exchange on which the Company's Common Stock is then listed or traded.

(gg) "Prospectus" means the Base Prospectus, as supplemented from time to time by any Prospectus Supplement (including the Initial Prospectus Supplement), including the documents and information incorporated by reference therein.

(hh) "Prospectus Supplement" means any prospectus supplement to the Base Prospectus (including the Initial Prospectus Supplement) filed with the SEC pursuant to Rule 424(b) under the Securities Act in connection with the transactions contemplated by this Agreement, including the documents and information incorporated by reference therein.

(ii) "Purchase Amount" means, with respect to any Regular Purchase, any Accelerated Purchase, or any Additional Accelerated Purchase made hereunder, as applicable, the portion of the Available Amount to be purchased by the Investor pursuant to Section 2 hereof.

(jj) "Purchase Date" means, with respect to a Regular Purchase made pursuant to Section 2(a) hereof, the Business Day on which the Investor receives, after 4:00 p.m., Eastern time, but prior to 6:00 p.m., Eastern time, on such Business Day, a valid Regular Purchase Notice for such Regular Purchase in accordance with this Agreement.

(kk) "Purchase Price" means, with respect to a Regular Purchase made pursuant to Section 2(a) hereof, the lower of: (i) the lowest Sale Price on the Purchase Date for such Regular Purchase and (ii) the arithmetic average of the three (3) lowest Closing Sale Prices for the Common Stock during the ten (10) consecutive Business Days ending on the Business Day immediately preceding such Purchase Date for such Regular Purchase (in each case, to be appropriately adjusted for any reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction that occurs on or after the date of this Agreement).

(ll) "Registration Rights Agreement" means that certain Registration Rights Agreement, of even date herewith between the Company and the Investor.

(mm) "Registration Statement" has the meaning set forth in the Registration Rights Agreement.

(nn) "Regular Purchase Notice" means, with respect to a Regular Purchase pursuant to Section 2(a) hereof, an irrevocable written notice from the Company to the Investor directing the Investor to buy a specified number of Purchase Shares (subject to the Purchase Share limitations contained in Section 2(a) hereof) at the applicable Purchase Price for such Regular Purchase in accordance with this Agreement.

(oo) "Sale Price" means any trade price for the shares of Common Stock on the Principal Market as reported by the Principal Market.

(pp) "SEC" means the U.S. Securities and Exchange Commission.

(qq) "Securities" means, collectively, the Purchase Shares and the Commitment Shares (as defined below).

(rr) "Securities Act" means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

(ss) "Shelf Registration Statement" has the meaning set forth in the Registration Rights Agreement.

(tt) "Subsidiary" means any Person the Company wholly-owns or controls, or in which the Company, directly or indirectly, owns a majority of the voting stock or similar voting interest, in each case that would be disclosable pursuant to Item 601(b)(21) of Regulation S-K promulgated under the Securities Act.

(uu) "Transaction Documents" means, collectively, this Agreement and the schedules and exhibits hereto, the Registration Rights Agreement and the schedules and exhibits thereto.

(vv) "Transfer Agent" means Broadridge Corporate Issuer Solutions, Inc., or such other Person who is then serving as the transfer agent for the Company in respect of the Common Stock.

(ww) "VWAP" means in respect of an Accelerated Purchase Date and an Additional Accelerated Purchase Date, as applicable, the volume weighted average price of the Common Stock on the Principal Market, as reported on the Principal Market.

2. PURCHASE OF COMMON STOCK.

Subject to the terms and conditions set forth in this Agreement, the Company has the right, but not the obligation, to sell to the Investor, in the Company's sole and absolute discretion, and the Investor has the obligation to purchase from the Company, Purchase Shares as follows:

(a) Commencement of Regular Sales of Common Stock. Beginning one (1) Business Day following the satisfaction of the conditions set forth in Sections 7 and 8 hereof (the "Commencement" and the date of satisfaction of such conditions, the "Commencement Date") and thereafter, the Company shall have the right, but not the obligation, to direct the Investor, by its delivery to the Investor of a Regular Purchase Notice from time to time on any Purchase Date, to purchase up to Two Hundred Fifty Thousand (250,000) Purchase Shares, subject to adjustment as set forth below in this Section 2(a) (such maximum number of Purchase Shares, as may be adjusted from time to time, the "Regular Purchase Share Limit"), at the Purchase Price on the Purchase Date (each such purchase a "Regular Purchase"); all of which share and dollar amounts shall be appropriately proportionately adjusted for any reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction; provided that if, after giving effect to the full proportionate adjustment to the Regular Purchase Share Limit therefor, the Fully Adjusted Regular Purchase Share Limit then in effect would preclude the Company from delivering to the Investor a Regular Purchase Notice hereunder for a Purchase Amount (calculated by multiplying (X) the number of Purchase Shares equal to the Fully Adjusted Regular Purchase Share Limit, by (Y) the Purchase Price per Purchase Share covered by such Regular Purchase Notice on the applicable Purchase Date therefor) equal to or greater than the Alternate Adjusted Regular Purchase Share Limit, the Regular Purchase Share Limit for such Regular Purchase Notice shall not be fully adjusted to equal the applicable Fully Adjusted Regular Purchase Share Limit, but rather the Regular Purchase Share Limit for such Regular Purchase Notice shall be adjusted to equal the applicable Alternate Adjusted Regular Purchase Share Limit as of the applicable Purchase Date for such Regular Purchase Notice; and provided, further, however, that the Investor's committed obligation under any single Regular Purchase, other than any Regular Purchase with respect to which an Alternate Adjusted Regular Purchase Share Limit shall apply, shall not exceed Three Million Dollars ($3,000,000) and provided, further, however, that the parties may mutually agree to increase the Regular Purchase Share Limit for any Regular Purchase to a number of shares greater than the Regular Purchase Share limit then in effect. If the Company delivers any Regular Purchase Notice for a Purchase Amount in excess of the limitations contained in the immediately preceding sentence, such Regular Purchase Notice shall be void *ab initio* only with respect to the extent of the amount by which the number of Purchase Shares set forth in such Regular Purchase Notice exceeds the number of Purchase Shares which the Company is permitted to include in such Purchase Notice in accordance herewith, and the Investor shall have no obligation to purchase such excess Purchase Shares in respect of such Regular Purchase Notice; provided, however, that the Investor shall remain obligated to purchase the number of Purchase Shares which the Company is permitted to include in such Regular Purchase Notice. The Company may deliver multiple Regular Purchase Notices to the Investor as often as every Business Day, so long as the Company has not failed to deliver Purchase Shares for the most recent prior Regular Purchase. Notwithstanding the foregoing, the Company shall not deliver any Regular Purchase Notices during the PEA Period.

(b) Accelerated Purchases. Subject to the terms and conditions of this Agreement, from and after one (1) Business Day following the Commencement Date, in addition to purchases of Purchase Shares as described in Section 2(a) hereof, the Company shall also have the right, but not the obligation, to direct the Investor, by its delivery to the Investor of an Accelerated Purchase Notice from time to time in accordance with this Agreement, to purchase the applicable Accelerated Purchase Share Amount at the Accelerated Purchase Price on the Accelerated Purchase Date therefor in accordance with this Agreement (each such purchase, an "Accelerated Purchase"); provided however, that the parties may mutually agree to increase the Accelerated Purchase Share Amount. The Company may deliver an Accelerated Purchase Notice to the Investor only on a Purchase Date on which the Company also properly submitted a Regular Purchase Notice providing for a Regular Purchase of a number of Purchase Shares not less than the Regular Purchase Share Limit then in effect on such Purchase Date in accordance with this Agreement (including, without limitation, giving effect to any automatic increase to the Regular Purchase Share Limit as a result of the Closing Sale Price of the Common Stock exceeding certain thresholds set forth in Section 2(a) hereof on such Purchase Date and any other adjustments to the Regular Purchase Share Limit, in each case pursuant to Section 2(a) hereof). If the Company delivers any Accelerated Purchase Notice directing the Investor to purchase an amount of Purchase Shares that exceeds the Accelerated Purchase Share Amount that the Company is then permitted to include in such Accelerated Purchase Notice, such Accelerated Purchase Notice shall be void *ab initio* only with respect to the extent of the amount by which the number of Purchase Shares set forth in such Accelerated Purchase Notice exceeds the Accelerated Purchase Share Amount that the Company is then permitted to include in such Accelerated Purchase Notice (which shall be confirmed in an Accelerated Purchase Confirmation), and the Investor shall have no obligation to purchase such excess Purchase Shares in respect of such Accelerated Purchase Notice; provided, however, that the Investor shall remain obligated to purchase the Accelerated Purchase Share Amount which the Company is permitted to include in such Accelerated Purchase Notice. Within one (1) Business Day after completion of each Accelerated Purchase Date for an Accelerated Purchase, the Investor will provide to the Company a written confirmation of such Accelerated Purchase setting forth the applicable Accelerated Purchase Share Amount and Accelerated Purchase Price for such Accelerated Purchase (each, an "Accelerated Purchase Confirmation"). Notwithstanding the foregoing, the Company shall not deliver any Accelerated Purchase Notices during the PEA Period.

(c) Additional Accelerated Purchases. Subject to the terms and conditions of this Agreement, from and after one (1) Business Day following the Commencement Date, in addition to purchases of Purchase Shares as described in Section 2(a) and Section 2(b) hereof, the Company shall also have the right, but not the obligation, to direct the Investor, by its timely delivery to the Investor of an Additional Accelerated Purchase Notice on an Additional Accelerated Purchase Date in accordance with this Agreement, to purchase the applicable Additional Accelerated Purchase Share Amount at the applicable Additional Accelerated Purchase Price therefor in accordance with this Agreement (each such purchase, an "Additional Accelerated Purchase"); provided however, that the parties may mutually agree to increase the Additional Accelerated Purchase Share Amount for any Additional Accelerated Purchase. The Company may deliver multiple Additional Accelerated Purchase Notices to the Investor on an Additional Accelerated Purchase Date; provided, however, that the Company may deliver an Additional Accelerated Purchase Notice to the Investor only (i) on a Business Day that is also the Accelerated Purchase Date for an Accelerated Purchase with respect to which the Company properly submitted to the Investor an Accelerated Purchase Notice in accordance with this Agreement on the applicable Purchase Date for a Regular Purchase of a number of Purchase Shares not less than the Regular Purchase Share Limit then in effect in accordance with this Agreement (including, without limitation, giving effect to any automatic increase to the Regular Purchase Share Limit as a result of the Closing Sale Price of the Common Stock exceeding certain thresholds set forth in Section 2(a) hereof on such Purchase Date and any other adjustments to the Regular Purchase Share Limit, in each case pursuant to Section 2(a) hereof), and (ii) if all Purchase Shares subject to all prior Regular Purchases, Accelerated Purchases and Additional Accelerated Purchases, including, without limitation, those that have been effected on the same Business Day as the applicable Additional Accelerated Purchase Date with respect to which the applicable Additional Accelerated Purchase relates, in each case have theretofore been received by the Investor as DWAC Shares in accordance with this Agreement. If the Company delivers any Additional Accelerated Purchase Notice directing the Investor to purchase an amount of Purchase Shares that exceeds the Additional Accelerated Purchase Share Amount that the Company is then permitted to include in such Additional Accelerated Purchase Notice, such Additional Accelerated Purchase Notice shall be void *ab initio* only with respect to the extent of the amount by which the number of Purchase Shares set forth in such Additional Accelerated Purchase Notice exceeds the Additional Accelerated Purchase Share Amount that the Company is then permitted to include in such Additional Accelerated Purchase Notice (which shall be confirmed in an Additional Accelerated Purchase Confirmation), and the Investor shall have no obligation to purchase such excess Purchase Shares in respect of such Additional Accelerated Purchase Notice; provided, however, that the Investor shall remain obligated to purchase the Additional Accelerated Purchase Share Amount which the Company is permitted to include in such Additional Accelerated Purchase Notice. Within one (1) Business Day after completion of each Additional Accelerated Purchase Date, the Investor will provide to the Company a written confirmation of each Additional Accelerated Purchase on such Additional Accelerated Purchase Date setting forth the applicable Additional Accelerated Purchase Share Amount and Additional Accelerated Purchase Price for each such Additional Accelerated Purchase on such Additional Accelerated Purchase Date (each, an "Additional Accelerated Purchase Confirmation"). Notwithstanding the foregoing, the Company shall not deliver any Additional Accelerated Purchase Notices during the PEA Period.

(d) Compliance with Principal Market Rules. Notwithstanding anything in this Agreement to the contrary, and in addition to the limitations set forth in Section 2(f) hereof, the Company shall not issue more than 24,910,904 shares (including the Commitment Shares) of Common Stock for less than $1.06 (the "Minimum Price") under this Agreement, which equals 19.99% of the Company's outstanding shares of Common Stock as of the date hereof (the "Exchange Cap"), unless stockholder approval is obtained to issue shares of Common Stock in excess of the Exchange Cap and otherwise in accordance with the applicable rules of the Principal Market. Notwithstanding the foregoing, the Company shall not be required or permitted to issue, and the Investor shall not be required to purchase, any shares of Common Stock under this Agreement if such issuance would violate the rules or regulations of the Principal Market. The Company may, in its sole discretion, determine whether to obtain stockholder approval to issue and sell shares in excess of the Exchange Cap at a price less than the Minimum Price if such issuance would require stockholder approval under the rules or regulations of the Principal Market. The Exchange Cap shall be reduced, on a share-for-share basis, by the number of shares of Common Stock issued or issuable that may be aggregated with the transactions contemplated by this Agreement under applicable rules of the Principal Market.

(e) Payment for Purchase Shares. For each Regular Purchase, the Investor shall pay to the Company an amount equal to the Purchase Amount with respect to such Regular Purchase, as applicable, as full payment for such Purchase Shares via wire transfer of immediately available funds on the same Business Day that the Investor receives such Purchase Shares, if such Purchase Shares are received by the Investor before 1:00 p.m., Eastern time, or, if such Purchase Shares are received by the Investor after 1:00 p.m., Eastern time, the next Business Day. For each Accelerated Purchase and each Additional Accelerated Purchase, the Investor shall pay to the Company an amount equal to the Purchase Amount with respect to such Accelerated Purchase and Additional Accelerated Purchase, respectively, as full payment for such Purchase Shares via wire transfer of immediately available funds on the second (2^{nd}) Business Day following the date that the Investor receives such Purchase Shares. If the Company or the Transfer Agent shall fail for any reason or for no reason to electronically transfer any Purchase Shares as DWAC Shares with respect to any Regular Purchase, Accelerated Purchase or Additional Accelerated Purchase (as applicable) within two (2) Business Days following the receipt by the Company of the Purchase Price, Accelerated Purchase Price or Additional Accelerated Purchase Price, respectively, therefor in compliance with this Section 2(e), and if on or after such Business Day the Investor purchases (in an open market transaction or otherwise) shares of Common Stock to deliver in satisfaction of a sale by the Investor of such Purchase Shares that the Investor anticipated receiving from the Company in respect of such Regular Purchase, Accelerated Purchase or Additional Accelerated Purchase (as applicable), then the Company shall, within two (2) Business Days after the Investor's request, either (i) pay cash to the Investor in an amount equal to the Investor's total purchase price (including customary brokerage commissions, if any) for the shares of Common Stock so purchased (the "Cover Price"), at which point the Company's obligation to deliver such Purchase Shares as DWAC Shares shall terminate, or (ii) promptly honor its obligation to deliver to the Investor such Purchase Shares as DWAC Shares and pay cash to the Investor in an amount equal to the excess (if any) of the Cover Price over the total Purchase Amount paid by the Investor pursuant to this Agreement for all of the Purchase Shares to be purchased by the Investor in connection with such purchases. The Company shall not issue any fraction of a share of Common Stock upon any Regular Purchase, Accelerated Purchase or Additional Accelerated Purchase. If the issuance would result in the issuance of a fraction of a share of Common Stock, the Company shall round such fraction of a share of Common Stock up or down to the nearest whole share. All payments made under this Agreement shall be made in lawful money of the United States of America or wire transfer of immediately available funds to such account as the Company may from time to time designate by written notice in accordance with the provisions of this Agreement. Whenever any amount expressed to be due by the terms of this Agreement is due on any day that is not a Business Day, the same shall instead be due on the next succeeding day that is a Business Day.

(f) Beneficial Ownership Limitation. Notwithstanding anything to the contrary contained in this Agreement, the Company shall not issue or sell, and the Investor shall not purchase or acquire, any shares of Common Stock under this Agreement which, when aggregated with all other shares of Common Stock then beneficially owned by the Investor and its affiliates (as calculated pursuant to Section 13(d) of the Exchange Act and Rule 13d-3 promulgated thereunder), would result in the beneficial ownership by the Investor and its affiliates of more than 4.99% of the then issued and outstanding shares of Common Stock (the "Beneficial Ownership Limitation"). Upon the written or oral request of the Investor, the Company shall promptly (but not later than one (1) Business Day) confirm orally or in writing to the Investor the number of shares of Common Stock then outstanding. The Investor, upon written notice to the Company, may increase the Beneficial Ownership Limitation provisions of this Section 2(f), provided that the Beneficial Ownership Limitation in no event exceeds 9.99% of the number of shares of Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock pursuant to this Agreement and the provisions of this Section 2(f) shall continue to apply. Any increase in the Beneficial Ownership Limitation will not be effective until the sixty-first (61st) day after such written notice is delivered to the Company. The provisions of this paragraph shall be construed and implemented in a manner otherwise than in strict conformity with the terms of this Section 2(f) to correct this paragraph (or any portion hereof) which may be defective or inconsistent with the intended Beneficial Ownership Limitation herein contained or to make changes or supplements necessary or desirable to properly give effect to such limitation. The Investor and the Company shall each cooperate in good faith in the determinations required hereby and the application hereof. The Investor's written certification to the Company of the applicability of the Beneficial Ownership Limitation, and the resulting effect thereof hereunder at any time, shall be conclusive with respect to the applicability thereof and such result absent manifest error.

3. INVESTOR'S REPRESENTATIONS AND WARRANTIES.

The Investor represents and warrants to the Company that as of the date hereof and as of the Commencement Date:

(a) Organization, Authority. Investor is an entity duly organized, validly existing and in good standing under the laws of the jurisdiction of its organization, with the requisite power and authority to enter into and to consummate the transactions contemplated by this Agreement and the other Transaction Documents to which it is a party and otherwise to carry out its obligations hereunder and thereunder.

(b) Investment Purpose. The Investor is acquiring the Securities as principal for its own account for investment only and not with a view to or for distributing or reselling such Securities or any part thereof in violation of the Securities Act or any applicable state securities law, has no present intention of distributing any of such Securities in violation of the Securities Act or any applicable state securities law and has no direct or indirect arrangement or understandings with any other Persons to distribute or regarding the distribution of such Securities in violation of the Securities Act or any applicable state securities law (this representation and warranty not limiting the Investor's right to sell the Securities at any time pursuant to the Registration Statement described herein or otherwise in compliance with applicable federal and state securities laws). The Investor is acquiring the Securities hereunder in the ordinary course of its business.

(c) Accredited Investor Status. The Investor is an "accredited investor" as that term is defined in Rule 501(a)(3) of Regulation D promulgated under the Securities Act.

(d) Information. The Investor understands that its investment in the Securities involves a high degree of risk. The Investor (i) is able to bear the economic risk of an investment in the Securities including a total loss thereof, (ii) has such knowledge and experience in financial and business matters that it is capable of evaluating the merits and risks of the proposed investment in the Securities and (iii) has had an opportunity to ask questions of and receive answers from the officers of the Company concerning the financial condition and business of the Company and other matters related to an investment in the Securities. Neither such inquiries nor any other due diligence investigations conducted by the Investor or its representatives shall modify, amend or affect the Investor's right to rely on the Company's representations and warranties contained in Section 4 hereof. The Investor has sought such accounting, legal and tax advice as it has considered necessary to make an informed investment decision with respect to its acquisition of the Securities and is not relying on any accounting, legal tax or other advice from the Company or its officers, employees or representatives. The Investor acknowledges and agrees that the Company neither makes nor has made any representations or warranties with respect to the transactions contemplated hereby other than those specifically set forth in Section 4 hereof.

(e) No Governmental Review. The Investor understands that no U.S. federal or state agency or any other government or governmental agency has passed on or made any recommendation or endorsement of the Securities or the fairness or suitability of an investment in the Securities nor have such authorities passed upon or endorsed the merits of the offering of the Securities.

(f) Validity; Enforcement. This Agreement and the other Transaction Documents have been duly and validly authorized, executed and delivered on behalf of the Investor and each is a valid and binding agreement of the Investor enforceable against the Investor in accordance with its terms, subject as to enforceability to general principles of equity and to applicable bankruptcy, insolvency, reorganization, moratorium, liquidation and other similar laws relating to, or affecting generally, the enforcement of applicable creditors' rights and remedies.

(g) Residency. The Investor's principal place of business is located in of the State of Illinois.

(h) No Short Selling. The Investor represents and warrants to the Company that at no time prior to the date of this Agreement has any of the Investor, its agents, representatives or affiliates engaged in or effected, in any manner whatsoever, directly or indirectly, any (i) "short sale" (as such term is defined in Rule 200 of Regulation SHO of the Exchange Act) of the Common Stock or (ii) hedging transaction, which establishes a net short position with respect to the Common Stock.

4. REPRESENTATIONS AND WARRANTIES OF THE COMPANY.

The Company represents and warrants to the Investor that, as of the date hereof and as of the Commencement Date:

(a) Organization and Qualification. The Company and each of its Subsidiaries is an entity duly incorporated or otherwise organized, validly existing and in good standing under the laws of the jurisdiction of its incorporation or organization, with the requisite corporate power and authority to own and use its properties and assets and to carry on its business as currently conducted. Neither the Company nor any of its Subsidiaries are in violation or default of any of the provisions of its respective certificate or articles of formation or incorporation, bylaws or other organizational or charter documents. Each of the Company and its Subsidiaries are duly qualified to conduct business and is in good standing as a foreign corporation or other entity in each jurisdiction in which the nature of the business conducted or property owned by it makes such qualification necessary, and no proceeding has been instituted in any such jurisdiction revoking, limiting or curtailing or seeking to revoke, limit or curtail such power and authority or qualification, except where the failure to be so qualified or in good standing or such proceeding, as the case may be, would not reasonably be expected to result in a Material Adverse Effect. The Company has no Subsidiaries except as disclosed in the SEC Documents.

(b) Authorization; Enforcement; Validity. The Company has the requisite corporate power and authority to enter into and perform its obligations under this Agreement and each of the other Transaction Documents, and to issue the Securities in accordance with the terms hereof and thereof. The execution and delivery of the Transaction Documents by the Company and the consummation by it of the transactions contemplated hereby and thereby, including without limitation, the issuance of the Commitment Shares (as defined below in Section 5(e)), the reservation for issuance and the issuance of the Purchase Shares issuable under this Agreement, have been duly authorized by the Company's board of directors, or a validly authorized committee thereof (collectively, the "Board of Directors"), and no further consent or authorization is required by the Company, its Board of Directors or any committee thereof, or its stockholders (save to the extent provided in this Agreement). This Agreement has been, and each other Transaction Document shall be on the Commencement Date, duly executed and delivered by the Company, and this Agreement constitutes, and each other Transaction Document upon its execution on behalf of the Company, shall constitute, the valid and binding obligations of the Company enforceable against the Company in accordance with their terms, except as such enforceability may be limited by general principles of equity or applicable bankruptcy, insolvency, reorganization, moratorium, liquidation or similar laws relating to, or affecting generally, the enforcement of creditors' rights and remedies. The Board of Directors of the Company has approved all applicable resolutions (the "Signing Resolutions") to authorize the Company to enter into and deliver this Agreement and to perform the transactions contemplated hereby. The Signing Resolutions are valid, in full force and effect and have not been modified or supplemented in any respect. The Company has delivered to the Investor a true and correct copy of a unanimous written consent adopting the Signing Resolutions executed by all of the members of the Board of Directors of the Company. Except as set forth in this Agreement, no other approvals or consents of the Board of Directors, any other authorized committee thereof, and/or stockholders is necessary under applicable laws and the Company's articles of incorporation, as amended (the "Articles of Incorporation"), and/or bylaws, as amended (the "Bylaws"), to authorize the execution and delivery of this Agreement or any of the transactions contemplated hereby, including, but not limited to, the issuance of the Commitment Shares and the issuance of the Purchase Shares.

(c) Capitalization. As of the date hereof, the authorized capital stock of the Company consists of 250,000,000 shares of $0.001 par value Common Stock and 1,000,000 shares of $0.001 par value preferred stock. Except as disclosed in the SEC Documents (as defined below), (i) no shares of the Company's capital stock are subject to preemptive rights or any other similar rights or any liens or encumbrances suffered or permitted by the Company, (ii) there are no outstanding debt securities, (iii) there are no outstanding options, warrants, scrip, rights to subscribe to, calls or commitments of any character whatsoever relating to, or securities or rights convertible into, any shares of capital stock of the Company or any of its Subsidiaries, or contracts, commitments, understandings or arrangements by which the Company or any of its Subsidiaries are or may become bound to issue additional shares of capital stock of the Company or any of its Subsidiaries or options, warrants, scrip, rights to subscribe to, calls or commitments of any character whatsoever relating to, or securities or rights convertible into, any shares of capital stock of the Company or any of its Subsidiaries, (iv) there are no agreements or arrangements under which the Company or any of its Subsidiaries are obligated to register the sale of any of their securities under the Securities Act (except the Registration Rights Agreement and those registration rights for which a registration statement has been filed and is effective), (v) there are no outstanding securities or instruments of the Company or any of its Subsidiaries which contain any redemption or similar provisions, and there are no contracts, commitments, understandings or arrangements by which the Company or any of its Subsidiaries are or may become bound to redeem a security of the Company or any of its Subsidiaries, (vi) there are no securities or instruments containing anti-dilution or similar provisions that will be triggered by the issuance of the Securities as described in this Agreement and (vii) the Company does not have any stock appreciation rights or "phantom stock" plans or agreements or any similar plan or agreement. The Company has furnished to the Investor true and correct copies of the Articles of Incorporation and the Bylaws, each as in effect on the date hereof, and copies of any documents containing the material rights of holders of securities convertible or exercisable for Common Stock, to the extent not filed as an exhibit to the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2023 or other Exchange Act reports.

(d) Issuance of Securities. Upon issuance and payment therefor in accordance with the terms and conditions of this Agreement, the Purchase Shares shall be validly issued, fully paid and nonassessable and free from all taxes, liens, charges, restrictions, rights of first refusal and preemptive rights with respect to the issue thereof, with the holders being entitled to all rights accorded to a holder of Common Stock. Five Million (5,000,000) shares of Common Stock have been duly authorized and reserved for issuance upon purchase under this Agreement as Purchase Shares. Two Hundred Forty-Five Thousand Ninety-Eight (245,098) shares of Common Stock (subject to equitable adjustment for any reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction) have been duly authorized and reserved for issuance as Initial Commitment Shares (as defined below in Section 5(e)) in accordance with this Agreement. The Initial Commitment Shares shall be validly issued, fully paid and nonassessable and free from all taxes, Liens, charges, restrictions, rights of first refusal and preemptive rights with respect to the issue thereof, with the holders being entitled to all rights accorded to a holder of Common Stock. Four Hundred Ninety Thousand One Hundred Ninety-Six (490,196) shares of Common Stock (subject to equitable adjustment for any reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction) have been duly authorized and reserved for issuance as Additional Commitment Shares (as defined below in Section 5(e)) in accordance with this Agreement. When issued in accordance with this Agreement, the Additional Commitment Shares shall be validly issued, fully paid and nonassessable and free from all taxes, liens, charges, restrictions, rights of first refusal and preemptive rights with respect to the issue thereof, with the holders being entitled to all rights accorded to a holder of Common Stock. The Securities are being issued pursuant to the Registration Statement, and the issuance of the Securities has been registered by the Company pursuant to the Securities Act. Upon receipt of the Purchase Shares and the Commitment Shares, the Investor will have good and marketable title to such Securities and such Securities will be immediately freely tradable on the Principal Market by any holder who is not an "affiliate" under the Act.

(e) No Conflicts. The execution, delivery and performance of the Transaction Documents by the Company and the consummation by the Company of the transactions contemplated hereby and thereby (including, without limitation, the reservation for issuance and issuance of the Purchase Shares and the Commitment Shares) will not (i) result in a violation of the Articles of Incorporation, any Certificate of Designations, Preferences and Rights of any outstanding series of preferred stock of the Company or the Bylaws or (ii) conflict with, or constitute a default (or an event which with notice or lapse of time or both would become a default) under, or give to others any rights of termination, amendment, acceleration or cancellation of, any material agreement, indenture or instrument to which the Company or any of its Subsidiaries is a party, or result in a violation of any law, rule, regulation, order, judgment or decree (including federal and state securities laws and regulations and the rules and regulations of the Principal Market applicable to the Company or any of its Subsidiaries) or by which any property or asset of the Company or any of its Subsidiaries is bound or affected, except in the case of conflicts, defaults, terminations, amendments, accelerations, cancellations and violations under clause (ii), which would not reasonably be expected to result in a Material Adverse Effect. Neither the Company nor its Subsidiaries are in violation of any term of or in default under its Articles of Incorporation, any Certificate of Designation, Preferences and Rights of any outstanding series of preferred stock of the Company or Bylaws or their organizational charter or bylaws, respectively. Neither the Company nor any of its Subsidiaries are in violation of any term of or are in default under any material contract, agreement, mortgage, indebtedness, indenture, instrument, judgment, decree or order or any statute, rule or regulation applicable to the Company or its Subsidiaries, except for possible conflicts, defaults, terminations or amendments that would not reasonably be expected to have a Material Adverse Effect. The business of the Company and its Subsidiaries is not being conducted, and shall not be conducted, in violation of any law, ordinance or regulation of any governmental entity, except for possible violations, the sanctions for which either individually or in the aggregate would not reasonably be expected to have a Material Adverse Effect. Except as specifically contemplated by this Agreement and as required under the Securities Act or applicable state securities laws and the rules and regulations of the Principal Market, the Company is not required to obtain any consent, authorization or order of, or make any filing or registration with, any court or governmental agency or any regulatory or self-regulatory agency in order for it to execute, deliver or perform any of its obligations under or contemplated by the Transaction Documents in accordance with the terms hereof or thereof. Except as set forth elsewhere in this Agreement, (i) all consents, authorizations, orders, filings and registrations which the Company is required to obtain pursuant to the preceding sentence on or prior to the date hereof or on or prior to the Commencement Date shall be obtained or effected on or prior to the date hereof and on or prior to the Commencement Date, respectively, and (ii) all consents, authorizations, orders, filings and registrations which the Company is required to obtain pursuant to the preceding sentence with respect to the Commencement shall be obtained or effected on or prior to the Commencement Date.

(f) SEC Documents; Financial Statements. The Company has filed all reports, schedules, forms, statements and other documents required to be filed by the Company under the Securities Act and the Exchange Act, including pursuant to Section 13(a) or 15(d) thereof, for the twelve (12) months preceding the date hereof (or such shorter period as the Company was required by law or regulation to file such material) (the foregoing materials, including the exhibits thereto and documents incorporated by reference therein, together with each Prospectus, being collectively referred to herein as the "SEC Documents") on a timely basis or has received a valid extension of such time of filing and has filed any such SEC Documents prior to the expiration of any such extension. As of their respective dates, the SEC Documents complied in all material respects with the requirements of the Securities Act and the Exchange Act, as applicable. None of the SEC Documents, when filed, contained any untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. The financial statements of the Company included in the SEC Documents comply in all material respects with applicable accounting requirements and the rules and regulations of the SEC with respect thereto as in effect at the time of filing. Such financial statements have been prepared in accordance with United States generally accepted accounting principles applied on a consistent basis during the periods involved ("GAAP"), except as may be otherwise specified in such financial statements or the notes thereto and except that unaudited financial statements may not contain all footnotes required by GAAP, and fairly present in all material respects the financial position of the Company and its consolidated Subsidiaries as of and for the dates thereof and the results of operations and cash flows for the periods then ended, subject, in the case of unaudited financial statements, to normal, immaterial, year-end audit adjustments. Except as publicly available through the SEC's Electronic Data Gathering, Analysis, and Retrieval system (EDGAR) or in connection with a confidential treatment request submitted to the SEC, the Company has received no notices or correspondence from the SEC for the one (1) year preceding the date hereof other than SEC comment letters relating to the Company's filings under the Exchange Act and the Securities Act. There are no outstanding or unresolved comments in comment letters received from the SEC staff with respect to any of the SEC Documents. To the Company's knowledge, the SEC has not commenced any enforcement proceedings against the Company or any of its Subsidiaries.

(g) Absence of Certain Changes. Except as disclosed in the SEC Documents, since September 30, 2024, there has been no material adverse change in the business, properties, operations, financial condition or results of operations of the Company or its Subsidiaries. For purposes of this Agreement, neither a decrease in cash or cash equivalents or in the market price of the Common Stock nor losses incurred in the ordinary course of the Company's business shall be deemed or considered a material adverse change. The Company has not taken any steps, and does not currently expect to take any steps, to seek protection pursuant to any Bankruptcy Law nor does the Company or any of its Subsidiaries have any knowledge or reason to believe that its creditors intend to initiate involuntary bankruptcy or insolvency proceedings. The Company is financially solvent and is generally able to pay its debts as they become due.

(h) Absence of Litigation. Except as disclosed in the SEC Documents, there is no action, suit, proceeding, inquiry or investigation before or by any court, public board, government agency, self-regulatory organization or body pending or, to the knowledge of the Company or any of its Subsidiaries, threatened against the Company, the Common Stock or any of the Company's or its Subsidiaries' officers or directors in their capacities as such, which could reasonably be expected to have a Material Adverse Effect.

(i) Acknowledgment Regarding Investor's Status. The Company acknowledges and agrees that the Investor is acting solely in the capacity of arm's length purchaser with respect to the Transaction Documents and the transactions contemplated hereby and thereby. The Company further acknowledges that the Investor is not acting as a financial advisor or fiduciary of the Company (or in any similar capacity) with respect to the Transaction Documents and the transactions contemplated hereby and thereby and any advice given by the Investor or any of its representatives or agents in connection with the Transaction Documents and the transactions contemplated hereby and thereby is merely incidental to the Investor's purchase of the Securities. The Company further represents to the Investor that the Company's decision to enter into the Transaction Documents has been based solely on the independent evaluation by the Company and its representatives and advisors.

(j) No Aggregated Offering. Neither the Company, nor any of its affiliates, nor any Person acting on its or their behalf has, directly or indirectly, made any offers or sales of any security or solicited any offers to buy any security, under circumstances that would cause this offering of the Securities to be integrated or aggregated with prior offerings by the Company in a manner that would require stockholder approval pursuant to the rules of the Principal Market on which any of the securities of the Company are listed or designated. The issuance and sale of the Commitment Shares hereunder do not, and subject to the terms of this Agreement, the issuance and sale of the additional Purchase Shares will not, contravene the rules and regulations of the Principal Market.

(k) Intellectual Property Rights. The Company and its Subsidiaries own or possess adequate rights or licenses to use all material trademarks, trade names, service marks, service mark registrations, service names, patents, patent rights, copyrights, inventions, licenses, approvals, governmental authorizations, trade secrets and rights necessary to conduct their respective businesses as now conducted. None of the Company's material trademarks, trade names, service marks, service mark registrations, service names, patents, patent rights, copyrights, inventions, licenses, approvals, government authorizations, trade secrets or other intellectual property rights have expired or terminated, or, by the terms and conditions thereof, could expire or terminate within two (2) years from the date of this Agreement, except as would not reasonably be expected to have a Material Adverse Effect. Except as set forth in the SEC Documents, the Company and its Subsidiaries do not have any knowledge of any infringement by the Company or its Subsidiaries of any material trademark, trade name rights, patents, patent rights, copyrights, inventions, licenses, service names, service marks, service mark registrations, trade secret or other similar rights of others, or of any such development of similar or identical trade secrets or technical information by others, and there is no claim, action or proceeding that has been brought against, or to the Company's knowledge, being threatened against, the Company or its Subsidiaries regarding trademark, trade name, patents, patent rights, invention, copyright, license, service names, service marks, service mark registrations, trade secret or other infringement, which could reasonably be expected to have a Material Adverse Effect.

(l) Environmental Laws. To the Company's knowledge, the Company and its Subsidiaries (i) are in compliance with any and all applicable foreign, federal, state and local laws and regulations relating to the protection of human health and safety, the environment or hazardous or toxic substances or wastes, pollutants or contaminants ("Environmental Laws"), (ii) have received all permits, licenses or other approvals required of them under applicable Environmental Laws to conduct their respective businesses and (iii) are in compliance with all terms and conditions of any such permit, license or approval, except where, in each of the three foregoing clauses, the failure to so comply could not reasonably be expected to have, individually or in the aggregate, a Material Adverse Effect.

(m) Title. Except as set forth in the SEC Documents, the Company and its Subsidiaries have good and marketable title in fee simple to all real property owned by them and good and marketable title in all personal property owned by them that is material to the business of the Company and its Subsidiaries, taken as a whole, in each case free and clear of all liens, encumbrances and defects ("Liens") and, except for Liens as do not materially affect the value of such property and do not materially interfere with the use made and proposed to be made of such property by the Company and its Subsidiaries and Liens for the payment of federal, state or other taxes, the payment of which is neither delinquent nor subject to penalties. Any real property and facilities held under lease by the Company and its Subsidiaries are held by them under valid, subsisting and enforceable leases with which the Company and its Subsidiaries are in compliance with such exceptions as are not material and do not interfere with the use made and proposed to be made of such property and buildings by the Company and its Subsidiaries, taken as a whole, except for such interference which would not reasonably be expected to have a Material Adverse Effect.

(n) Insurance. The Company and each of its Subsidiaries are insured by insurers of recognized financial responsibility against such losses and risks and in such amounts as management of the Company believes to be prudent and customary in the businesses in which the Company and its Subsidiaries are engaged. Neither the Company nor any such Subsidiary has been refused any insurance coverage sought or applied for and neither the Company nor any such Subsidiary has any reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage from similar insurers as may be necessary to continue its business at a cost that would not materially and adversely affect the condition, financial or otherwise, or the earnings, business or operations of the Company and its Subsidiaries, taken as a whole.

(o) Regulatory Permits. Except as disclosed in the SEC Documents, the Company and its Subsidiaries possess all material certificates, authorizations and permits issued by the appropriate federal, state or foreign regulatory authorities necessary to conduct their respective businesses as currently conducted and neither the Company nor any such Subsidiary has received any written notice of proceedings relating to the revocation or modification of any such material certificate, authorization or permit, except in the case of each of the two foregoing clauses, as would not reasonably be expected to have a Material Adverse Effect.

(p) Tax Status. The Company and each of its Subsidiaries has made or filed all foreign, federal and state income and all other material tax returns, reports and declarations required by any jurisdiction to which it is subject or otherwise filed timely extensions (unless and only to the extent that the Company and each of its Subsidiaries has set aside on its books provisions reasonably adequate for the payment of all unpaid and unreported taxes) and has paid all taxes and other governmental assessments and charges that are material in amount, shown or determined to be due on such returns, reports and declarations, except those being contested in good faith and has set aside on its books provision reasonably adequate for the payment of all taxes for periods subsequent to the periods to which such returns, reports or declarations apply.

(q) Transactions With Affiliates. Except as disclosed in the SEC Documents, none of the Company's stockholders, officers or directors or any family member or affiliate of any of the foregoing, has either directly or indirectly an interest in, or is a party to, any transaction that would be required to be disclosed as a related party transaction pursuant to Item 404 of Regulation S-K promulgated under the Securities Act.

(r) Application of Takeover Protections. The Company and its Board of Directors have taken or will take prior to the Commencement Date all necessary action, if any, in order to render inapplicable any control share acquisition, business combination, poison pill (including any distribution under a rights agreement) or other similar anti-takeover provision under the Articles of Incorporation or the laws of the state of its incorporation which is or could become applicable to the Investor as a result of the transactions contemplated by this Agreement, including, without limitation, the Company's issuance of the Securities and the Investor's ownership of the Securities.

(s) Disclosure. Except with respect to the material terms and conditions of the transactions contemplated by the Transaction Documents or any other agreements to be entered into by the Company and the Investor that, in each case, which shall be timely publicly disclosed by the Company, the Company confirms that neither it nor any other Person acting on its behalf has provided the Investor or its agents or counsel with any information that the Company believes constitutes or would reasonably constitute material, non-public information which is not otherwise disclosed or incorporated by reference in the Registration Statement or the SEC Documents. The Company understands and confirms that the Investor will rely on the foregoing representation in effecting purchases and sales of securities of the Company. All of the disclosure furnished by or on behalf of the Company to the Investor regarding the Company, its business and the transactions contemplated hereby, including the disclosure schedules to this Agreement, is true and correct in all material respects and does not contain any untrue statement of a material fact or omit to state any material fact necessary in order to make the statements made therein, in light of the circumstances under which they were made, not misleading. The press releases disseminated by the Company during the twelve (12) months preceding the date of this Agreement taken as a whole do not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary in order to make the statements therein, in light of the circumstances under which they were made and when made, not misleading. The Company acknowledges and agrees that the Investor neither makes nor has made any representations or warranties with respect to the transactions contemplated hereby other than those specifically set forth in Section 3 hereof.

(t) Foreign Corrupt Practices. Neither the Company, nor to the knowledge of the Company, any agent or other Person acting on behalf of the Company, has (i) directly or indirectly, used any funds for unlawful contributions, gifts, entertainment or other unlawful expenses related to foreign or domestic political activity, (ii) made any unlawful payment to foreign or domestic government officials or employees or to any foreign or domestic political parties or campaigns from corporate funds, (iii) failed to disclose fully any contribution made by the Company (or made by any Person acting on its behalf of which the Company is aware) which is in violation of law, or (iv) violated in any material respect any provision of the Foreign Corrupt Practices Act of 1977, as amended.

(u) DTC Eligibility. The Company, through the Transfer Agent, currently participates in the DTC Fast Automated Securities Transfer (FAST) Program and the Common Stock can be transferred electronically to third parties via the DTC Fast Automated Securities Transfer (FAST) Program.

(v) Sarbanes-Oxley. The Company is in material compliance with all provisions of the Sarbanes-Oxley Act of 2002, as amended, which are applicable to it as of the date hereof.

(w) Certain Fees. No brokerage or finder's fees or commissions are or will be payable by the Company to any broker, financial advisor or consultant, finder, placement agent, investment banker, bank or other Person with respect to the transactions contemplated by the Transaction Documents. The Investor shall have no obligation with respect to any fees or with respect to any claims made by or on behalf of other Persons for fees of a type contemplated in this Section 4(w) that may be due in connection with the transactions contemplated by the Transaction Documents.

(x) Investment Company. The Company is not required to be registered as, and immediately after receipt of payment for the Purchase Shares will not be required to be registered as, an "investment company" within the meaning of the Investment Company Act of 1940, as amended.

(y) Listing and Maintenance Requirements. The Common Stock is registered pursuant to Section 12(b) of the Exchange Act, and the Company has taken no action designed to, or which to its knowledge is likely to have the effect of, terminating the registration of the Common Stock pursuant to the Exchange Act nor has the Company received any notification that the SEC is currently contemplating terminating such registration. The Securities have been approved for listing on the Principal Market prior to issuance. The Company has taken no action designed to, or likely to have the effect of, delisting the Common Stock from the Principal Market, nor has the Company received any notice from any Person to the effect that the Company is not in compliance with the listing or maintenance requirements of the Principal Market. The Company is, and has no reason to believe that it will not in the foreseeable future continue to be, in compliance with all such listing and maintenance requirements.

(z) Accountants. The Company's accountants are set forth in the SEC Documents and, to the knowledge of the Company, such accountants are an independent registered public accounting firm as required by the Securities Act.

(aa) No Market Manipulation. The Company has not, and to its knowledge no Person acting on its behalf has, (i) taken, directly or indirectly, any action designed to cause or to result in the stabilization or manipulation of the price of any security of the Company to facilitate the sale or resale of any of the Securities, (ii) sold, bid for, purchased, or, paid any compensation for soliciting purchases of, any of the Securities, or (iii) paid or agreed to pay to any Person any compensation for soliciting another to purchase any other securities of the Company in connection with the transactions contemplated in this Agreement.

(bb) Shell Company Status. The Company is not currently an issuer identified in Rule 144(i)(1) under the Securities Act.

(cc) No Disqualification Events. None of the Company, any of its predecessors, any affiliated issuer, any director, executive officer, other officer of the Company participating in the offering contemplated hereby, any beneficial owner of 20% or more of the Company's outstanding voting equity securities, calculated on the basis of voting power, nor any promoter (as that term is defined in Rule 405 under the Securities Act) connected with the Company in any capacity at the time of sale (each, an "Issuer Covered Person") is subject to any of the "Bad Actor" disqualifications described in Rule 506(d)(1)(i) to (viii) under the Securities Act (a "Disqualification Event"), except for a Disqualification Event covered by Rule 506(d)(2) or (d)(3) under the Securities Act. The Company has exercised reasonable care to determine whether any Issuer Covered Person is subject to a Disqualification Event.

(dd) Registration Statement. The Company has prepared and filed the Shelf Registration Statement with the SEC in accordance with the Securities Act. The Shelf Registration Statement was declared effective by order of the SEC on August 5, 2024. The Shelf Registration Statement is effective pursuant to the Securities Act and available for the issuance of the Securities thereunder. No stop order suspending the effectiveness of the Shelf Registration Statement has been issued by the SEC, and no proceeding for that purpose or pursuant to Section 8A of the Securities Act against the Company or related to the offering of the Securities has been initiated or, to the knowledge of the Company, threatened by the SEC. The "Plan of Distribution" section of the Prospectus permits the issuance of the Securities under the terms of this Agreement. At the time the Shelf Registration Statement and any amendments thereto became effective, at the date of this Agreement and at each deemed effective date thereof pursuant to Rule 430B(f)(2) of the Securities Act, the Shelf Registration Statement and any amendments thereto complied and will comply in all material respects with the requirements of the Securities Act and did not and will not contain any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary to make the statements therein not misleading; and the Base Prospectus and any Prospectus Supplement thereto, at the time such Base Prospectus or such Prospectus Supplement thereto was issued and on the Commencement Date, complied and will comply in all material respects with the requirements of the Securities Act and did not and will not contain an untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading; provided that this representation and warranty does not apply to statements in or omissions from any Prospectus Supplement made in reliance upon and in conformity with information relating to the Investor furnished to the Company in writing by or on behalf of the Investor expressly for use therein. The Company meets all of the requirements for the use of a registration statement on Form S-3 pursuant to the Securities Act for the offering and sale of the Securities contemplated by this Agreement in reliance on General Instruction I.B.1., and the SEC has not notified the Company of any objection to the use of the form of the Registration Statement pursuant to Rule 401(g)(1) of the Securities Act. The Company hereby confirms that the issuance of the Securities to the Investor in accordance with this Agreement would not result in non-compliance with the Securities Act or any of the General Instructions to Form S-3. The Registration Statement, as of its effective date, meets the requirements set forth in Rule 415(a)(1)(x) pursuant to the Securities Act. At the earliest time after the filing of the Registration Statement that the Company or another offering participant made a bona fide offer (within the meaning of Rule 164(h)(2) of the Securities Act) relating to any of the Securities, the Company was, and as of the date of this Agreement the Company is, not an Ineligible Issuer (as defined in Rule 405 of the Securities Act). The Company has not distributed any offering material in connection with the offering, issuance and sale of any of the Securities, other than the Shelf Registration Statement or any amendment thereto, the Prospectus or any Prospectus Supplement required pursuant to applicable law or the Transaction Documents. The Company has not made an offer relating to the Securities that would constitute a "free writing prospectus" as defined in Rule 405 under the Securities Act.

(ee) Absence of Schedules. In the event that on the date hereof, or the Commencement Date, the Company does not deliver any disclosure schedule contemplated by this Agreement, the Company hereby acknowledges and agrees that each such undelivered disclosure schedule shall be deemed to read as follows: "Nothing to Disclose."

5. COVENANTS.

(a) Filing of Current Report and Initial Prospectus Supplement. The Company agrees that it shall, within the time required under the Exchange Act, file with the SEC a Current Report on Form 8-K relating to the transactions contemplated by, and describing the material terms and conditions of, the Transaction Documents (the "Current Report"). The Company further agrees that it shall, within the time required under Rule 424(b) under the Securities Act, file with the SEC the Initial Prospectus Supplement pursuant to Rule 424(b) under the Securities Act specifically relating to the transactions contemplated by, and describing the material terms and conditions of, the Transaction Documents, containing information previously omitted at the time of effectiveness of the Shelf Registration Statement in reliance on Rule 430B under the Securities Act, and disclosing all information relating to the transactions contemplated hereby required to be disclosed in the Shelf Registration Statement and the Prospectus as of the date of the Initial Prospectus Supplement, including, without limitation, information required to be disclosed in the section captioned "Plan of Distribution" in the Prospectus. The Investor acknowledges that it will be identified in the Initial Prospectus Supplement as an underwriter within the meaning of Section 2(a)(11) of the Securities Act. The Company shall permit the Investor to review and comment upon the Current Report and the Initial Prospectus Supplement at least two (2) Business Days prior to their filing with the SEC, the Company shall give due consideration to all such comments. The Investor shall use its reasonable best efforts to provide any comments upon the Current Report and the Initial Prospectus Supplement within one (1) Business Day from the date the Investor receives a substantially complete draft thereof from the Company. The Investor shall furnish to the Company such information regarding itself, the Securities held by it and the intended method of distribution thereof, including any arrangement between the Investor and any other Person relating to the sale or distribution of the Securities, as shall be reasonably requested by the Company in connection with the preparation and filing of the Current Report and the Initial Prospectus Supplement, and shall otherwise cooperate with the Company as reasonably requested by the Company in connection with the preparation and filing of the Current Report and the Initial Prospectus Supplement with the SEC.

(b) Blue Sky. The Company shall take all such action, if any, as is reasonably necessary in order to obtain an exemption for or to register or qualify (i) the issuance and the sale of the Securities to the Investor under this Agreement and (ii) any subsequent resale of all Commitment Shares and all Purchase Shares by the Investor, in each case, under applicable securities or "Blue Sky" laws of the states of the United States in such states as is reasonably requested by the Investor from time to time, and shall provide evidence of any such action so taken to the Investor.

(c) Listing/DTC. The Company shall use commercially reasonable efforts to maintain, so long as any shares of Common Stock shall be so listed, such listing of all Purchase Shares and Commitment Shares from time to time issuable hereunder. The Company shall use commercially reasonable efforts to maintain the listing of the Common Stock on the Principal Market and shall use commercially reasonable efforts to comply in all respects with the Company's reporting, filing and other obligations under the Bylaws or rules and regulations of the Principal Market. The Company shall not take any action that would reasonably be expected to result in the delisting or suspension of the Common Stock on the Principal Market. The Company shall promptly, and in no event later than the following Business Day, provide to the Investor copies of any notices it receives from any Person regarding the continued eligibility of the Common Stock for listing on the Principal Market; provided, however, that the Company shall not be required to provide the Investor copies of any such notice that the Company reasonably believes constitutes material non-public information and the Company would not be required to publicly disclose such notice in any report or statement filed with the SEC and under the Exchange Act or the Securities Act. The Company shall pay all fees and expenses in connection with satisfying its obligations under this Section 5(c). The Company shall take all commercially reasonable action necessary to ensure that its Common Stock can be transferred electronically as DWAC Shares.

(d) Prohibition of Short Sales and Hedging Transactions. The Investor agrees that beginning on the date of this Agreement and ending on the date of termination of this Agreement as provided in Section 11 hereof, the Investor and its agents, representatives and affiliates shall not in any manner whatsoever enter into or effect, directly or indirectly, any (i) "short sale" (as such term is defined in Rule 200 of Regulation SHO of the Exchange Act) of the Common Stock or (ii) hedging transaction, which establishes a net short position with respect to the Common Stock.

(e) Issuance of Commitment Shares. In consideration for the Investor's execution and delivery of this Agreement, the Company shall cause the Transfer Agent to issue on the date of this Agreement Two Hundred Forty-Five Thousand Ninety-Eight (245,098) shares of Common Stock (the "Initial Commitment Shares") directly to the Investor and shall deliver to the Transfer Agent the Irrevocable Transfer Agent Instructions in the form as set forth in Section 6 hereof. For the avoidance of doubt, all of the Initial Commitment Shares shall be fully earned as of the date of this Agreement, whether or not the Commencement shall occur or any Purchase Shares are purchased by the Investor under this Agreement and irrespective of any termination of this Agreement. In connection with each Regular Purchase and each Accelerated Purchase of Purchase Shares hereunder, the Company shall issue to the Investor a number of shares of Common Stock (the "Additional Commitment Shares" and, together with the Initial Commitment Shares, the "Commitment Shares") equal to the product of (x) Four Hundred Ninety Thousand One Hundred Ninety-Six (490,196) and (y) the Purchase Amount Fraction. The "Purchase Amount Fraction" shall mean a fraction, the numerator of which is the Purchase Amount purchased by the Investor with respect to such Regular Purchase and Accelerated Purchase (as applicable) of Purchase Shares and the denominator of which is Thirty Million Dollars ($30,000,000). The Additional Commitment Shares shall be issued to the Investor on the same Business Day as Purchase Shares are issued to the Investor in connection with the applicable Regular Purchase and Accelerated Purchase (as applicable) in accordance with Section 2 hereof. In no event shall the amount of the Additional Commitment Shares to be issued under this Agreement exceed Four Hundred Ninety Thousand One Hundred Ninety-Six (490,196) shares of Common Stock, provided that such Additional Commitment Shares shall be equitably adjusted for any reorganization, recapitalization, non-cash dividend, stock split, reverse stock split or other similar transaction.

(f) Due Diligence; Non-Public Information. During the term of this Agreement, the Investor shall have the right, from time to time as the Investor may reasonably deem appropriate, and upon reasonable advance notice to the Company, to perform reasonable due diligence on the Company during normal business hours. The Company and its officers and employees shall provide material information and reasonably cooperate with the Investor in connection with any reasonable request by the Investor related to the Investor's due diligence of the Company. Each party hereto agrees not to disclose any Confidential Information of the other party to any third party and shall not use the Confidential Information for any purpose other than in connection with, or in furtherance of, the transactions contemplated hereby. Each party hereto acknowledges that the Confidential Information shall remain the property of the disclosing party and agrees that it shall take all reasonable measures to protect the secrecy of any Confidential Information disclosed by the other party. The receiving party may disclose Confidential Information to the extent such information is required to be disclosed by law, regulation or order of a court of competent jurisdiction or regulatory authority, provided that the receiving party shall promptly notify the disclosing party when such requirement to disclose arises, and shall cooperate with the disclosing party so as to enable the disclosing party to: (i) seek an appropriate protective order; and (ii) make any applicable claim of confidentiality in respect of such Confidential Information; and provided, further, that the receiving party shall disclose Confidential Information only to the extent required by the protective order or other similar order, if such an order is obtained, and, if no such order is obtained, the receiving party shall disclose only the minimum amount of such Confidential Information required to be disclosed in order to comply with the applicable law, regulation or order. In addition, any such Confidential Information disclosed pursuant to this section shall continue to be deemed Confidential Information. Notwithstanding anything in this Agreement to the contrary, the Company shall not be obligated to provide the Investor with any information that constitutes or may reasonably be considered to constitute material, non-public information pursuant to a request for information hereunder, and the Company and the Investor agree that neither the Company nor any other Person acting on its behalf shall provide the Investor or its agents or counsel with any information that constitutes or may reasonably be considered to constitute material, non-public information, unless a simultaneous public announcement thereof is made by the Company in the manner contemplated by Regulation FD. In the event of a breach of the foregoing covenant by the Company or any Person acting on its behalf (as determined in the reasonable good faith judgment of the Investor), in addition to any other remedy provided herein or in the other Transaction Documents, if the Investor is holding any Securities at the time of the disclosure of such material non-public information, the Investor shall have the right to make a public disclosure, in the form of a press release, public advertisement or otherwise, of such material, non-public information without the prior approval by the Company; provided the Investor shall have first provided notice to the Company that it believes it has received information that constitutes material, non-public information; and the Company shall have at least two (2) Business Days from such notice to either publicly disclose such material, non-public information or to demonstrate to the Investor that such information does not constitute material, non-public information, and (assuming the Investor and Investor's counsel disagree in their reasonable good faith judgment with the Company's determination) prior to any such disclosure by the Investor; and the Company shall have failed to publicly disclose such material, non-public information. The Investor shall not have any liability to the Company, any of its Subsidiaries, or any of their respective directors, officers, employees, stockholders or agents, for any such disclosure in accordance with this Section 5(f). The Company understands and confirms that the Investor shall be relying on the foregoing covenants in effecting transactions in securities of the Company.

(g) Purchase Records. The Investor and the Company shall each maintain records showing the remaining Available Amount at any given time and the dates and Purchase Amounts for each Regular Purchase, Accelerated Purchase and Additional Accelerated Purchase or shall use such other method, reasonably satisfactory to the Investor and the Company.

(h) Taxes. The Company shall pay any and all transfer, stamp or similar taxes that may be payable with respect to the issuance and delivery of any shares of Common Stock to the Investor made under this Agreement.

(i) Use of Proceeds. The Company will use the net proceeds from the offering for any corporate purpose at the sole discretion of the Company.

(j) Other Transactions. The Company shall not enter into, announce or recommend to its stockholders any agreement, plan, arrangement or transaction in or of which the terms thereof would restrict, materially delay, conflict with or impair the ability or right of the Company to perform its obligations under the Transaction Documents, including, without limitation, the obligation of the Company to deliver the Commitment Shares to the Investor in accordance with the terms of the Transaction Documents.

(k) Aggregation. From and after the date of this Agreement, neither the Company, nor or any of its affiliates will, and the Company shall use its reasonable best efforts to ensure that no Person acting on their behalf will, directly or indirectly, make any offers or sales of any security or solicit any offers to buy any security, under circumstances that would cause this offering of the Securities by the Company to the Investor to be aggregated with other offerings by the Company in a manner that would require stockholder approval pursuant to the rules of the Principal Market on which any of the securities of the Company are listed or designated, unless stockholder approval is obtained before the closing of such subsequent transaction in accordance with the rules of such Principal Market.

(l) Limitation on Variable Rate Transactions. From and after the date of this Agreement until the thirty-six (36) month anniversary of the date of this Agreement (irrespective of any earlier termination of this Agreement), the Company shall be prohibited from effecting or entering into an agreement to effect any issuance by the Company or any of its Subsidiaries of Common Stock involving a Variable Rate Transaction other than with the Investor. "Variable Rate Transaction" means an "equity line of credit" or substantially similar transaction whereby an investor is irrevocably bound to purchase securities over a period of time from the Company at a price based on the market price of the Company's Common Stock at the time of each such purchase, provided, however, that this Section 5(l) shall not be deemed to prohibit the issuance and sale of Common Stock pursuant to an "at-the-market offering" by the Company exclusively through a registered broker-dealer acting as agent of the Company pursuant to a written agreement between the Company and such registered broker-dealer.

6. TRANSFER AGENT INSTRUCTIONS.

(a) Initial Commitment Shares. On the date of this Agreement, the Company shall issue to the Transfer Agent (and any subsequent transfer agent) irrevocable instructions, in the form agreed to prior to the date hereof (the "Irrevocable Transfer Agent Instructions"), to issue the Initial Commitment Shares in accordance with the terms of this Agreement. All Initial Commitment Shares to be issued to or for the benefit of the Investor pursuant to this Agreement shall be issued as DWAC Shares. The Company warrants to the Investor that, while the Agreement is effective, no instruction other than the Irrevocable Transfer Agent Instructions referred to in this Section 6 will be given by the Company to the Transfer Agent with respect to the Commitment Shares, and the Commitment Shares shall otherwise be freely transferable on the books and records of the Company.

(b) Purchase Shares. On the date of the Initial Prospectus Supplement, the Company shall issue to the Transfer Agent, and any subsequent transfer agent, irrevocable instructions in the form agreed to prior to the date hereof (the "Commencement Irrevocable Transfer Agent Instructions") to issue the Purchase Shares and Additional Commitment Shares in accordance with the terms of this Agreement and the Registration Rights Agreement. All Purchase Shares and Additional Commitment Shares to be issued from and after Commencement to or for the benefit of the Investor pursuant to this Agreement shall be issued only as DWAC Shares. The Company represents and warrants to the Investor that, while this Agreement is effective, no instruction other than as contemplated by the Commencement Irrevocable Transfer Agent Instructions and any Notice of Effectiveness of Registration Statement (as defined in the Registration Rights Agreement) will be given by the Company to the Transfer Agent with respect to the Purchase Shares from and after Commencement, and no instruction or other communication to the Transfer Agent with respect to the issuance of the Purchase Shares and Additional Commitment Shares shall be made without the approval of the Investor. The Company shall provide confirmation of receipt by the Transfer Agent of all instructions pursuant to the Commencement Irrevocable Transfer Agent Instructions with respect to Purchase Shares and Additional Commitment Shares within one (1) Business Day of delivery of any Purchase Notice. The Purchase Shares and Additional Commitment Shares covered by the Registration Statement shall otherwise be freely transferable on the books and records of the Company.

7. CONDITIONS TO THE COMPANY'S RIGHT TO COMMENCE SALES OF SHARES OF COMMON STOCK.

The right of the Company hereunder to commence sales of Purchase Shares is subject to the satisfaction, or where legally permissible, the waiver of each of the following conditions:

(a) The Investor shall have executed each of the Transaction Documents and delivered the same to the Company;

(b) The representations and warranties of the Investor shall be true and correct in all material respects as of the date hereof and as of the Commencement Date as though made at that time; and

(c) No stop order with respect to the Registration Statement shall be pending or threatened by the SEC.

8. CONDITIONS TO THE INVESTOR'S OBLIGATION TO PURCHASE SHARES OF COMMON STOCK.

The obligation of the Investor to buy Purchase Shares under this Agreement is subject to the satisfaction or, where legally permissible, the waiver of each of the following conditions on or prior to the Commencement Date and, once such conditions have been initially satisfied, there shall not be any ongoing obligation to satisfy such conditions after the Commencement has occurred:

(a) The Company shall have executed each of the Transaction Documents and delivered the same to the Investor;

(b) The Company shall have issued or caused to be issued to the Investor a number of shares of Common Stock equal to the number of Commitment Shares as DWAC Shares, in each case in accordance with Section 6;

(c) The Common Stock shall be listed on the Principal Market, and the Company shall have filed with The Nasdaq Capital Market a Notification Form: Listing of Additional Shares for the listing of the Securities, and Nasdaq shall have raised no objection to the consummation of the transactions contemplated by this Agreement;

(d) The Investor shall have received the opinion and negative assurances letter of the Company's legal counsel dated as of the Commencement Date substantially in the forms agreed prior to the date of this Agreement by the Company's legal counsel and the Investor's legal counsel;

(e) The representations and warranties of the Company in this Agreement shall be true and correct in all material respects (except to the extent that any of such representations and warranties is already qualified as to materiality in Section 4 hereof, in which case, such representations and warranties shall be true and correct without further qualification) as of the date hereof and as of the Commencement Date as though made at that time (except for representations and warranties that speak as of a specific date, which shall be true and correct in all material respects as of such date) and the Company shall have performed, satisfied and complied in all material respects with the covenants, agreements and conditions required by the Transaction Documents to be performed, satisfied or complied with by the Company at or prior to the Commencement Date. The Investor shall have received a certificate, executed by the CEO, President or CFO of the Company, dated as of the Commencement Date, to the foregoing effect in the form attached hereto as **Exhibit A**;

(f) The Board of Directors of the Company shall have adopted the Signing Resolutions, which shall be in full force and effect without any amendment or supplement thereto as of the Commencement Date;

(g) As of the Commencement Date, the Company shall have reserved out of its authorized and unissued Common Stock, (i) solely for the purpose of effecting purchases of Purchase Shares hereunder, Five Million (5,000,000) shares of Common Stock; and (ii) solely for the purpose of effecting the issuance of Additional Commitment Shares hereunder, Four Hundred Ninety Thousand One Hundred Ninety-Six (490,196) shares of Common Stock;

(h) Each of the Irrevocable Transfer Agent Instructions and the Commencement Irrevocable Transfer Agent Instructions shall have been delivered to and acknowledged in writing by the Company and the Transfer Agent (or any successor transfer agent);

(i) The Company shall have delivered to the Investor a certificate evidencing the incorporation and good standing of the Company in the State of Nevada issued by the Secretary of State of the State of Nevada and a certificate or its equivalent evidencing the good standing of the Company as a foreign corporation in any other jurisdiction where the Company is duly qualified to conduct business, in each case, as of a date within ten (10) Business Days of the Commencement Date;

(j) The Company shall have delivered to the Investor a certified copy of the Articles of Incorporation as certified by the Secretary of State of the State of Nevada within ten (10) Business Days of the Commencement Date;

(k) The Company shall have delivered to the Investor a secretary's certificate executed by the Secretary of the Company, dated as of the Commencement Date, in the form attached hereto as **Exhibit B**;

(l) The Shelf Registration Statement shall continue to be effective and no stop order with respect to the Shelf Registration Statement shall be pending or threatened by the SEC. The Company shall have a maximum dollar amount of Common Stock registered under the Shelf Registration Statement which is sufficient to issue to the Investor not less than (i) the full Available Amount worth of Purchase Shares plus (ii) all of the Commitment Shares. The Current Report and the Initial Prospectus Supplement each shall have been filed with the SEC, as required pursuant to Section 5(a), and copies of the Prospectus shall have been delivered to the Investor in accordance with the terms of the Registration Rights Agreement. The Prospectus shall be current and available for issuances and sales of all of the Securities by the Company to the Investor. Any other Prospectus Supplements required to have been filed by the Company with the SEC under the Securities Act at or prior to the Commencement Date shall have been filed with the SEC within the applicable time periods prescribed for such filings under the Securities Act. All reports, schedules, registrations, forms, statements, information and other documents required to have been filed by the Company with the SEC at or prior to the Commencement Date pursuant to the reporting requirements of the Exchange Act shall have been filed with the SEC within the applicable time periods prescribed for such filings under the Exchange Act;

(m) No Suspension Event has occurred, and no event which, after notice and/or lapse of time, would reasonably be expected to become a Suspension Event has occurred;

(n) The Exchange Cap has not been reached (to the extent the Exchange Cap is applicable pursuant to Section 2(d) hereof);

(o) All federal, state and local governmental laws, rules and regulations applicable to the transactions contemplated by the Transaction Documents and necessary for the execution, delivery and performance of the Transaction Documents and the consummation of the transactions contemplated thereby in accordance with the terms thereof shall have been complied with, and all consents, authorizations and orders of, and all filings and registrations with, all federal, state and local courts or governmental agencies and all federal, state and local regulatory or self-regulatory agencies necessary for the execution, delivery and performance of the Transaction Documents and the consummation of the transactions contemplated thereby in accordance with the terms thereof shall have been obtained or made, including, without limitation, in each case those required under the Securities Act, the Exchange Act, applicable state securities or "Blue Sky" laws or applicable rules and regulations of the Principal Market, or otherwise required by the SEC, the Principal Market or any state securities regulators;

(p) No statute, regulation, order, decree, writ, ruling or injunction shall have been enacted, entered, promulgated, threatened or endorsed by any federal, state or local or foreign court or governmental authority of competent jurisdiction which prohibits the consummation of or which would materially modify or delay any of the transactions contemplated by the Transaction Documents;

(q) No action, suit or proceeding before any federal, state, local or foreign arbitrator or any court or governmental authority of competent jurisdiction shall have been commenced or threatened, and no inquiry or investigation by any federal, state, local or foreign governmental authority of competent jurisdiction shall have been commenced or threatened, against the Company, or any of the officers, directors or affiliates of the Company, seeking to restrain, prevent or change the transactions contemplated by the Transaction Documents, or seeking material damages in connection with such transactions; and

(r) The Company shall have provided the Investor with the information requested by the Investor in connection with its due diligence requests in accordance with the terms of Section 5(f) hereof.

9. INDEMNIFICATION.

In consideration of the Investor's execution and delivery of the Transaction Documents and acquiring the Purchase Shares hereunder and in addition to all of the Company's other obligations under the Transaction Documents, the Company shall defend, protect, indemnify and hold harmless the Investor and all of its affiliates, stockholders, officers, directors and employees and any of the foregoing Person's agents or other representatives (including, without limitation, those retained in connection with the transactions contemplated by this Agreement) (collectively, the "Indemnitees") from and against any and all actions, causes of action, suits, claims, losses, costs, penalties, fees, liabilities and damages, and reasonable expenses in connection therewith (irrespective of whether any such Indemnitee is a party to the action for which indemnification hereunder is sought), and including reasonable attorneys' fees and disbursements (the "Indemnified Liabilities"), incurred by any Indemnitee as a result of, or arising out of, or relating to (a) any misrepresentation or breach of any representation or warranty made by the Company in the Transaction Documents or any other certificate, instrument or document executed by the Company contemplated hereby or thereby, (b) any breach of any covenant, agreement or obligation of the Company contained in the Transaction Documents or any other certificate, instrument or document executed by the Company contemplated hereby or thereby, (c) any cause of action, suit or claim brought or made against such Indemnitee and arising out of or resulting from the execution, delivery, performance or enforcement of the Transaction Documents or any other certificate, instrument or document contemplated hereby or thereby, other than, in the case of clause (c) with respect to Indemnified Liabilities which directly and primarily result from the fraud, gross negligence or willful misconduct of an Indemnitee. The indemnity in this Section 9 shall not apply to amounts paid in settlement of any claim if such settlement is effected without the prior written consent of the Company, which consent shall not be unreasonably withheld, conditioned or delayed. To the extent that the foregoing undertaking by the Company may be unenforceable for any reason, the Company shall make the maximum contribution to the payment and satisfaction of each of the Indemnified Liabilities which is permissible under applicable law. Payment under this indemnification shall be made within thirty (30) days from the date the Investor makes written request for it. A certificate containing reasonable detail as to the amount of such indemnification submitted to the Company by the Investor shall be conclusive evidence, absent manifest error, of the amount due from the Company to the Investor, provided that the Indemnitee shall undertake to repay any amounts paid to it hereunder if it is ultimately determined, by a final and non-appealable order of a court of competent jurisdiction, that the Indemnitee is not entitled to be indemnified against such Indemnified Liabilities by the Company pursuant to this Agreement. If any action shall be brought against any Indemnitee in respect of which indemnity may be sought pursuant to this Agreement, such Indemnitee shall promptly notify the Company in writing, and the Company shall have the right to assume the defense thereof with counsel of its own choosing reasonably acceptable to the Indemnitee. Any Indemnitee shall have the right to employ separate counsel in any such action and participate in the defense thereof, but the fees and expenses of such counsel shall be at the expense of such Indemnitee, except to the extent that (i) the employment thereof has been specifically authorized by the Company in writing, (ii) the Company has failed after a reasonable period of time to assume such defense and to employ counsel or (iii) in such action there is, in the reasonable opinion of such separate counsel, a material conflict on any material issue between the position of the Company and the position of such Indemnitee, in which case the Company shall be responsible for the reasonable fees and expenses of no more than one such separate counsel.

10. SUSPENSION EVENTS.

A "Suspension Event" shall be deemed to have occurred at any time as any of the following events occurs:

(a) the effectiveness of a Registration Statement registering the sale or resale of the Securities lapses for any reason (including, without limitation, the issuance of a stop order or similar order) or such registration statement (or the prospectus forming a part thereof) is unavailable to the Investor for sale or resale of any or all of the Securities to be issued to the Investor under the Transaction Documents that are required to be included therein, and such lapse or unavailability continues for a period of ten (10) consecutive Business Days or for more than an aggregate of thirty (30) Business Days in any 365-day period, but excluding a lapse or unavailability where (i) the Company terminates a Registration Statement after the Investor has confirmed in writing that all of the Securities covered thereby have been resold or (ii) the Company supersedes one Registration Statement with another Registration Statement, including (without limitation) by terminating a prior Registration Statement when it is effectively replaced with a new Registration Statement covering Securities (provided in the case of this clause (ii) that all of the Securities covered by the superseded (or terminated) Registration Statement that have not theretofore been resold are included in the superseding (or new) Registration Statement);

(b) the suspension of the Common Stock from trading on the Principal Market for a period of at least one (1) Business Day, provided that the Company may not direct the Investor to purchase any shares of Common Stock during any such suspension;

(c) the delisting of the Common Stock from The Nasdaq Capital Market provided, however, that the Common Stock is not immediately thereafter trading on The Nasdaq Capital Market, The Nasdaq Global Market, The Nasdaq Global Select Market, the New York Stock Exchange, the NYSE American, the NYSE Arca, or the OTCQB or the OTCQX operated by the OTC Markets Group, Inc. (or any nationally recognized successor to any of the foregoing);

(d) the failure for any reason by the Transfer Agent to issue (i) the Additional Commitment Shares to the Investor within two (2) Business Days after the date on which the Investor is entitled to receive such Additional Commitment Shares pursuant to Section 5(e) hereof and (ii) Purchase Shares to the Investor within two (2) Business Days after the applicable Purchase Date, Accelerated Purchase Date or Additional Accelerated Purchase Date (as applicable) on which the Investor is entitled to receive such Securities;

(e) the Company breaches any representation, warranty, covenant or other term or condition under any Transaction Document if such breach could have a Material Adverse Effect and except, in the case of a breach of a covenant which is reasonably curable, only if such breach continues for a period of at least five (5) Business Days;

(f) if any Person commences a proceeding against the Company pursuant to or within the meaning of any Bankruptcy Law;

(g) if the Company is at any time insolvent, or, pursuant to or within the meaning of any Bankruptcy Law, (i) commences a voluntary case, (ii) consents to the entry of an order for relief against it in an involuntary case, (iii) consents to the appointment of a Custodian of it or for all or substantially all of its property, or (iv) makes a general assignment for the benefit of its creditors or is generally unable to pay its debts as the same become due;

(h) a court of competent jurisdiction enters an order or decree under any Bankruptcy Law that (i) is for relief against the Company in an involuntary case, (ii) appoints a Custodian of the Company or for all or substantially all of its property, or (iii) orders the liquidation of the Company;

(i) if at any time the Company is not eligible to transfer its Common Stock electronically as DWAC Shares or if the Company fails to maintain the service of its Transfer Agent (or a successor Transfer Agent) with respect to the issuance of Purchase Shares under this Agreement, including but not limited to, maintaining the effectiveness of the Commencement Irrevocable Transfer Instructions, payment of all fees owed to the Transfer Agent and satisfaction of all conditions required by the Transfer Agent to issue Purchase Shares pursuant to the Commencement Irrevocable Transfer Agent Instructions; or

(j) if at any time the Investor's broker is unable to accept Purchase Shares for deposit.

In addition to any other rights and remedies under applicable law and this Agreement, so long as (i) a Suspension Event has occurred and is continuing, or if any event that, after notice and/or lapse of time, would reasonably be expected to become a Suspension Event, has occurred and is continuing or (ii) if at any time after the Commencement Date, the Exchange Cap is reached (to the extent the Exchange Cap is applicable pursuant to Section 2(d) hereof), the Company shall not deliver to the Investor any Regular Purchase Notice, Accelerated Purchase Notice or Additional Purchase Notice.

11. TERMINATION

This Agreement may be terminated only as follows:

(a) If pursuant to or within the meaning of any Bankruptcy Law, the Company commences a voluntary case or any Person commences a proceeding against the Company, a Custodian is appointed for the Company or for all or substantially all of its property, or the Company makes a general assignment for the benefit of its creditors (any of which would be a Suspension Event as described in Sections 10(f), 10(g) and 10(h) hereof), this Agreement shall automatically terminate without any liability or payment to the Company (except as set forth below) without further action or notice by any Person.

(b) At any time after the Commencement Date, the Company shall have the option to terminate this Agreement for any reason or for no reason by delivering notice (a "Company Termination Notice") to the Investor electing to terminate this Agreement without any liability whatsoever of any party to any other party under this Agreement (except as set forth below). The Company Termination Notice shall not be effective until one (1) Business Day after it has been received by the Investor.

(c) This Agreement shall automatically terminate on the date that the Company sells and the Investor purchases the full Available Amount as provided herein, without any action or notice on the part of any party and without any liability whatsoever of any party to any other party under this Agreement (except as set forth below).

(d) If, for any reason or for no reason, the full Available Amount has not been purchased in accordance with Section 2 of this Agreement by the Maturity Date, this Agreement shall automatically terminate on the Maturity Date, without any action or notice on the part of any party and without any liability whatsoever of any party to any other party under this Agreement (except as set forth below).

Except as set forth in Sections 11(a) (in respect of a Suspension Event under Sections 10(f), 10(g) and 10(h)), and 11(d), any termination of this Agreement pursuant to this Section 11 shall be effected by written notice from the Company to the Investor, or the Investor to the Company, as the case may be, setting forth the basis for the termination hereof. The representations and warranties and covenants of the Company and the Investor contained in Sections 3, 4, 5, and 6 hereof, the indemnification provisions set forth in Section 9 hereof and the agreements and covenants set forth in Sections 10, 11 and 12 shall survive the execution and delivery of this Agreement and any termination of this Agreement. No termination of this Agreement shall (i) affect the Company's or the Investor's rights or obligations under (A) this Agreement with respect to any pending Regular Purchases, Accelerated Purchases, or Additional Purchases, and the Company and the Investor shall complete their respective obligations with respect to any pending Regular Purchases, Accelerated Purchases and Additional Purchases under this Agreement and (B) the Registration Rights Agreement, which shall survive any such termination, or (ii) be deemed to release the Company or the Investor from any liability for intentional misrepresentation or willful breach of any of the Transaction Documents.

12. MISCELLANEOUS.

(a) Governing Law; Jurisdiction; Jury Trial. The corporate laws of the State of Nevada shall govern all issues concerning the relative rights of the Company and its stockholders. All other questions concerning the construction, validity, enforcement and interpretation of this Agreement and the other Transaction Documents shall be governed by the internal laws of the State of Illinois, without giving effect to any choice of law or conflict of law provision or rule (whether of the State of Illinois or any other jurisdictions) that would cause the application of the laws of any jurisdictions other than the State of Illinois. Each party hereby irrevocably submits to the exclusive jurisdiction of the state and federal courts sitting in the State of Illinois, County of Cook, for the adjudication of any dispute hereunder or under the other Transaction Documents or in connection herewith or therewith, or with any transaction contemplated hereby or discussed herein, and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding, any claim that it is not personally subject to the jurisdiction of any such court, that such suit, action or proceeding is brought in an inconvenient forum or that the venue of such suit, action or proceeding is improper. Each party hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof to such party at the address for such notices to it under this Agreement and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any manner permitted by law. **EACH PARTY HEREBY IRREVOCABLY WAIVES ANY RIGHT IT MAY HAVE, AND AGREES NOT TO REQUEST, A JURY TRIAL FOR THE ADJUDICATION OF ANY DISPUTE HEREUNDER OR IN CONNECTION HEREWITH OR ARISING OUT OF THIS AGREEMENT OR ANY TRANSACTION CONTEMPLATED HEREBY.**

(b) Counterparts. This Agreement may be executed in two or more identical counterparts, all of which shall be considered one and the same agreement and shall become effective when counterparts have been signed by each party and delivered to the other party; provided that a signature delivered by e-mail in a ".pdf" format data file shall be considered due execution and shall be binding upon the signatory thereto with the same force and effect as if the signature were an original signature.

(c) Headings. The headings of this Agreement are for convenience of reference and shall not form part of, or affect the interpretation of, this Agreement.

(d) Severability. If any provision of this Agreement shall be invalid or unenforceable in any jurisdiction, such invalidity or unenforceability shall not affect the validity or enforceability of the remainder of this Agreement in that jurisdiction or the validity or enforceability of any provision of this Agreement in any other jurisdiction.

(e) Entire Agreement. The Transaction Documents supersede all other prior oral or written agreements between the Investor, the Company, their affiliates and Persons acting on their behalf with respect to the subject matter thereof, and this Agreement, the other Transaction Documents and the instruments referenced herein contain the entire understanding of the parties with respect to the matters covered herein and therein and, except as specifically set forth herein or therein, neither the Company nor the Investor makes any representation, warranty, covenant or undertaking with respect to such matters. The Company acknowledges and agrees that is has not relied on, in any manner whatsoever, any representations or statements, written or oral, other than as expressly set forth in the Transaction Documents. The Investor acknowledges and agrees that it has not relied on, in any manner whatsoever, any representations or statements, written or oral, other than as expressly set forth in the Transaction Documents.

(f) Notices. Any notices, consents or other communications required or permitted to be given under the terms of this Agreement must be in writing and will be deemed to have been delivered: (i) upon receipt when delivered personally; (ii) upon receipt when sent by email (provided confirmation of transmission is mechanically or electronically generated and kept on file by the sending party); or (iii) one (1) Business Day after deposit with a nationally recognized overnight delivery service, in each case properly addressed to the party to receive the same. The addresses for such communications shall be:

If to the Company:

Lightwave Logic, Inc.
369 Inverness Parkway, Suite 350
Englewood, CO 80112
Telephone: (720) 340-4949
E-mail: jim@lightwavelogic.com
Attention: James S. Marcelli, Chief Financial Officer & Chief Operating Officer

With a copy to (which shall not constitute notice or service of process):

K&L Gates, LLP
200 S. Biscayne Blvd., Ste. 3900
Miami, Florida 33131
Telephone: (305) 539-3306
E-mail: clayton.parker@klgates.com
Attention: Clayton E. Parker, Esq.

If to the Investor:

Lincoln Park Capital Fund, LLC
415 N. LaSalle Dr., Suite 700B
Chicago, IL 60654
Telephone: (312) 822-9300
E-mail: jscheinfeld@lpcfunds.com/jcope@lpcfunds.com
Attention: Josh Scheinfeld/Jonathan Cope

If to the Transfer Agent:

Broadridge Corporate Issuer Solutions, Inc.
51 Mercedes Way
Edgewood, NY 11717
Telephone: (979) 218-8194
Email: autumn.tallaksen@broadridge.com
Attention: Autumn Tallaksen

or at such other address, email address and/or to the attention of such other Person as the recipient party has specified by written notice given to each other party three (3) Business Days prior to the effectiveness of such change. Written confirmation of receipt (A) given by the recipient of such notice, consent or other communication, (B) mechanically or electronically generated by the sender's email account containing the time, date, and recipient email address, as applicable, or (C) provided by a nationally recognized overnight delivery service, shall be rebuttable evidence of personal service, receipt by email or receipt from a nationally recognized overnight delivery service in accordance with clause (i), (ii) or (iii) above, respectively.

(g) Successors and Assigns. This Agreement shall be binding upon and inure to the benefit of the parties and their respective successors and assigns. The Company shall not assign this Agreement or any rights or obligations hereunder without the prior written consent of the Investor, including by merger or consolidation. The Investor may not assign its rights or obligations under this Agreement.

(h) No Third Party Beneficiaries. This Agreement is intended for the benefit of the parties hereto and their respective permitted successors and assigns, and is not for the benefit of, nor may any provision hereof be enforced by, any other Person.

(i) Publicity. The Company shall afford the Investor and its counsel with the opportunity to review and comment upon, shall consult with the Investor and its counsel on the form and substance of, and shall give due consideration to all such comments from the Investor or its counsel on, the Prospectus Supplement, any press release or any Current Report on Form 8-K by or on behalf of the Company relating to the Investor, its purchases hereunder or any aspect to the Transaction Documents or the transactions contemplated thereby, not less than twenty-four (24) hours prior to the issuance, filing or public disclosure thereof. The Investor must be provided with a final version of any such press release or SEC filing at least twenty-four (24) hours prior to any release, filing or use by the Company thereof.

(j) Further Assurances. Each party shall do and perform, or cause to be done and performed, all such further acts and things, and shall execute and deliver all such other agreements, certificates, instruments and documents, as the other party may reasonably request in order to consummate and make effective, as soon as reasonably possible, the Commencement, and to carry out the intent and accomplish the purposes of this Agreement and the consummation of the transactions contemplated hereby.

(k) No Financial Advisor, Placement Agent, Broker or Finder. The Company represents and warrants to the Investor that it has not engaged any financial advisor, placement agent, broker or finder in connection with the transactions contemplated hereby. The Investor represents and warrants to the Company that it has not engaged any financial advisor, placement agent, broker or finder in connection with the transactions contemplated hereby. The Company shall be responsible for the payment of any fees or commissions, if any, of any financial advisor, placement agent, broker or finder relating to or arising out of the transactions contemplated hereby. The Company shall pay, and hold the Investor harmless against, any liability, loss or expense (including, without limitation, reasonable attorneys' fees and out of pocket expenses) arising in connection with any such claim made by a third party for any such fees or commissions.

(l) No Strict Construction. The language used in this Agreement will be deemed to be the language chosen by the parties to express their mutual intent, and no rules of strict construction will be applied against any party.

(m) Remedies, Other Obligations, Breaches and Injunctive Relief. The Investor's remedies provided in this Agreement, including, without limitation, the Investor's remedies provided in Section 9, shall be cumulative and in addition to all other remedies available to the Investor under this Agreement, at law or in equity (including a decree of specific performance and/or other injunctive relief). No remedy of the Investor contained herein shall be deemed a waiver of compliance with the provisions giving rise to such remedy and nothing herein shall limit the Investor's right to pursue actual damages for any failure by the Company to comply with the terms of this Agreement. The Company acknowledges that a breach by it of its obligations hereunder will cause irreparable harm to the Investor and that the remedy at law for any such breach may be inadequate. The Company therefore agrees that, in the event of any such breach or threatened breach, the Investor shall be entitled, in addition to all other available remedies, to an injunction restraining any breach, without the necessity of showing economic loss and without any bond or other security being required.

(n) Enforcement Costs. If: (i) this Agreement is placed by the Investor in the hands of an attorney for enforcement or is enforced by the Investor through any legal proceeding; (ii) an attorney is retained to represent the Investor in any bankruptcy, reorganization, receivership or other proceedings affecting creditors' rights and involving a claim under this Agreement; or (iii) subject to Section 9, an attorney is retained to represent the Investor in any other proceedings whatsoever in connection with this Agreement, then the Company shall pay to the Investor, as incurred by the Investor, all reasonable costs and expenses including attorneys' fees incurred in connection therewith, in addition to all other amounts due hereunder.

(o) Amendment and Waiver; Failure or Indulgence Not Waiver. No provision of this Agreement (i) may be amended other than by a written instrument signed by both parties hereto and (ii) may be waived other than in a written instrument signed by the party against whom enforcement of such waiver is sought. No failure or delay in the exercise of any power, right or privilege hereunder shall operate as a waiver thereof, nor shall any single or partial exercise of any such power, right or privilege preclude other or further exercise thereof or of any other right, power or privilege.

* * * * *

IN WITNESS WHEREOF, the Investor and the Company have caused this Purchase Agreement to be duly executed as of the date first written above.

THE COMPANY:

LIGHTWAVE LOGIC, INC.

By: /s/ James S. Marcelli
Name: James S. Marcelli
Title: Chief Financial Officer & Chief Operating Officer

THE INVESTOR:

LINCOLN PARK CAPITAL FUND, LLC
BY: LINCOLN PARK CAPITAL, LLC
BY: ROCKLEDGE CAPITAL CORPORATION

By: /s/ Joshua Scheinfeld
Name: Joshua Scheinfeld
Title: President

EXHIBITS

Exhibit A	Form of Officer's Certificate
Exhibit B	Form of Secretary's Certificate

EXHIBIT A

FORM OF OFFICER'S CERTIFICATE

This Officer's Certificate ("**Certificate**") is being delivered pursuant to Section 8(e) of that certain Purchase Agreement dated as of March 17, 2025, ("**Purchase Agreement**"), by and between **LIGHTWAVE LOGIC, INC.**, a Nevada corporation (the "**Company**"), and **LINCOLN PARK CAPITAL FUND, LLC** (the "**Investor**"). Terms used herein and not otherwise defined shall have the meanings ascribed to them in the Purchase Agreement.

The undersigned, Yves LeMaitre, Chief Executive Officer of the Company, hereby certifies, on behalf of the Company and not in his individual capacity, as follows:

1. I am the Chief Executive Officer of the Company;

2. The representations and warranties of the Company contained in the Purchase Agreement are true and correct in all material respects (except to the extent that any of such representations and warranties is already qualified as to materiality in Section 4 of the Purchase Agreement, in which case, such representations and warranties are true and correct without further qualification) as of the date of the Purchase Agreement and as of the Commencement Date as though made at that time (except for representations and warranties that speak as of a specific date, in which case such representations and warranties are true and correct in all material respects as of such date);

3. The Company has performed, satisfied and complied in all material respects with covenants, agreements and conditions required by the Transaction Documents to be performed, satisfied or complied with by the Company at or prior to the Commencement Date, to the extent not otherwise waived.

4. The Company has not taken any steps, and does not currently expect to take any steps, to seek protection pursuant to any Bankruptcy Law nor does the Company or any of its Subsidiaries have any knowledge or reason to believe that its creditors intend to initiate involuntary bankruptcy or insolvency proceedings. The Company is financially solvent and is generally able to pay its debts as they become due.

IN WITNESS WHEREOF, I have hereunder signed my name on this ___ day of _____, 2025.

_____
Name: Yves LeMaitre
Title: Chief Executive Officer

EXHIBIT B

FORM OF SECRETARY'S CERTIFICATE

This Secretary's Certificate ("Certificate") is being delivered pursuant to Section 8(k) of that certain Purchase Agreement dated as of March 17, 2025 ("Purchase Agreement"), by and between **LIGHTWAVE LOGIC, INC.**, a Nevada corporation (the "Company"), and **LINCOLN PARK CAPITAL FUND, LLC** (the "Investor"), pursuant to which the Company may sell to the Investor up to Thirty Million Dollars ($30,000,000) of the Company's Common Stock, $0.001 par value per share (the "Common Stock"). Terms used herein and not otherwise defined shall have the meanings ascribed to them in the Purchase Agreement.

The undersigned, James S. Marcelli, Secretary of the Company, hereby certifies, on behalf of the Company and not in his individual capacity, as follows:

1. I am the Secretary of the Company.

2. Attached hereto as Exhibit A and Exhibit B are true, correct and complete copies of the Company's Restated Bylaws ("Bylaws") and Articles of Incorporation, as amended ("Charter"), and no action has been taken by the Company, its directors, officers or stockholders, in contemplation of the filing of any further amendment relating to or affecting the Bylaws or Charter.

3. Attached hereto as Exhibit C are true, correct and complete copies of the resolutions duly adopted by the Board of Directors of the Company by unanimous written consent effective as of March 17, 2025. Such resolutions have not been amended, modified or rescinded and remain in full force and effect and such resolutions are the only resolutions adopted by the Board of Directors, or any committee thereof, or the stockholders of the Company relating to or affecting (i) the entering into and performance of the Purchase Agreement, or the issuance, offering and sale of the Purchase Shares and the Commitment Shares and (ii) and the performance of the Company of its obligation under the Transaction Documents as contemplated therein.

4. As of the date hereof, the authorized, issued and reserved capital stock of the Company is as set forth on Exhibit D hereto.

IN WITNESS WHEREOF, I have hereunder signed my name on this ___ day of _____, 2025.

_____

Secretary

The undersigned as Chief Executive Officer of **LIGHTWAVE LOGIC, INC.**, a Nevada corporation, hereby certifies that James S. Marcelli is the duly elected, appointed, qualified and acting Secretary of Lightwave Logic, Inc., and that the signature appearing above is his genuine signature.

_____

Chief Executive Officer

REGISTRATION RIGHTS AGREEMENT

THIS REGISTRATION RIGHTS AGREEMENT (this "Agreement"), dated as of March 17, 2025, is entered into by and between **LIGHTWAVE LOGIC, INC.**, a Nevada corporation (the "Company"), and **LINCOLN PARK CAPITAL FUND, LLC,** an Illinois limited liability company (together with its permitted assigns, the "Investor"). Capitalized terms used herein and not otherwise defined herein shall have the respective meanings set forth in the Purchase Agreement by and between the parties hereto, dated as of the date hereof (as amended, restated, supplemented or otherwise modified from time to time, the "Purchase Agreement").

WHEREAS:

A. Upon the terms and subject to the conditions of the Purchase Agreement, (i) the Company has agreed to issue to the Investor, and the Investor has agreed to purchase, up to Thirty Million Dollars ($30,000,000) of the Company's common stock, par value $0.001 per share (the "Common Stock"), pursuant to the Purchase Agreement (such shares, the "Purchase Shares"), and (ii) the Company has agreed to issue to the Investor such number of shares of Common Stock as is required pursuant to the Purchase Agreement (the "Commitment Shares"); and

B. To induce the Investor to enter into the Purchase Agreement, the Company has agreed to provide certain registration rights under the Securities Act of 1933, as amended, and the rules and regulations thereunder, or any similar successor statute (collectively, the "Securities Act"), and applicable state securities laws.

NOW, THEREFORE, in consideration of the promises and the mutual covenants contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Company and the Investor hereby agree as follows:

1. DEFINITIONS.

For purposes of this Agreement, the following terms shall have the following meanings:

(a) "Register," "Registered," and "Registration" refer to a registration effected by preparing and filing one or more registration statements of the Company in compliance with the Securities Act and providing for offering securities on a continuous basis, and the declaration or ordering of effectiveness of such registration statement(s) by the SEC.

(b) "Registrable Securities" means the Purchase Shares that may from time to time be issued or issuable to the Investor upon purchases of the Available Amount under the Purchase Agreement (without regard to any limitation or restriction on purchases), the Commitment Shares issued or issuable to the Investor, and any Common Stock issued or issuable with respect to the Purchase Shares, the Commitment Shares or the Purchase Agreement as a result of any stock split, stock dividend, recapitalization, exchange or similar event, without regard to any limitation on purchases under the Purchase Agreement.

(c) "Registration Statement" means the Shelf Registration Statement and any other registration statement of the Company that Registers Registrable Securities, including a New Registration Statement, as amended when each became effective, including all documents filed as part thereof or incorporated by reference therein, and including any information contained in a Prospectus subsequently filed with the SEC.

(d) "Shelf Registration Statement" means the Company's existing registration statement on Form S-3 (File No. 333-281059).

2. REGISTRATION.

(a) Mandatory Registration. The Company agrees that it shall, within the time required under Rule 424(b) under the Securities Act, file with the SEC the Initial Prospectus Supplement pursuant to Rule 424(b) under the Securities Act specifically relating to the transactions contemplated by, and describing the material terms and conditions of, the Transaction Documents, containing information previously omitted at the time of effectiveness of the Registration Statement in reliance on Rule 430B under the Securities Act, and disclosing all information relating to the transactions contemplated hereby required to be disclosed in the Registration Statement and the Prospectus as of the date of the Initial Prospectus Supplement, including, without limitation, information required to be disclosed in the section captioned "Plan of Distribution" in the Prospectus. The Investor acknowledges that it will be identified in the Initial Prospectus Supplement as an underwriter within the meaning of Section 2(a)(11) of the Securities Act. The Company shall permit the Investor to review and comment upon the Initial Prospectus Supplement at least two (2) Business Days prior to its filing with the SEC, the Company shall give due consideration to all such comments, and the Company shall not file the Initial Prospectus Supplement with the SEC in a form to which the Investor reasonably objects. The Investor shall use its reasonable best efforts to comment upon the Initial Prospectus Supplement within one (1) Business Day from the date the Investor receives a substantially complete draft thereof from the Company. The Investor shall furnish to the Company such information regarding itself, the Securities held by it and the intended method of distribution thereof, including any arrangement between the Investor and any other Person relating to the sale or distribution of the Securities, as shall be reasonably requested by the Company in connection with the preparation and filing of the Initial Prospectus Supplement, and shall otherwise cooperate with the Company as reasonably requested by the Company in connection with the preparation and filing of the Initial Prospectus Supplement with the SEC.

(b) Effectiveness. The Company shall use its reasonable best efforts to keep the Registration Statement effective pursuant to Rule 415 promulgated under the Securities Act, and to keep the Registration Statement and the Prospectus current and available for issuances and sales of all possible Registrable Securities by the Company to the Investor, and for the resale of all of the Registrable Securities by the Investor, at all times until the earlier of (i) the date on which the Investor shall have sold all the Securities and no Available Amount remains under this Agreement and (ii) 180 days following the earlier of termination of this Agreement and the Maturity Date (the "Registration Period"). Without limiting the generality of the foregoing, during the Registration Period, the Company shall (a) take all action necessary to cause the Common Stock to continue to be Registered as a class of securities under Section 12(b) of the Exchange Act and shall not take any action or file any document (whether or not permitted by the Exchange Act) to terminate or suspend such registration and (b) file or furnish on or before their respective due dates all reports and other documents required to be filed or furnished by the Company pursuant to Sections 13(a), 13(c), 14, 15(d) or any other provision of or under the Exchange Act, and shall not take any action or file any document (whether or not permitted by the Exchange Act) to terminate or suspend its reporting and filing obligations under the Exchange Act. The Registration Statement (including any amendments or supplements thereto and prospectuses contained therein) shall not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in light of the circumstances in which they were made, not misleading.

(c) Prospectus Amendments or Supplements. Except as provided in this Agreement and other than periodic and current reports required to be filed pursuant to the Exchange Act, the Company shall not file with the SEC any amendment to the Registration Statement or any supplement to the Base Prospectus that refers to the Investor, the Transaction Documents or the transactions contemplated thereby (including, without limitation, any Prospectus Supplement filed in connection with the transactions contemplated by the Transaction Documents), in each case with respect to which (a) the Investor shall not previously have been advised and afforded the opportunity to review and comment thereon at least two (2) Business Days prior to filing with the SEC, as the case may be, (b) the Company shall not have given due consideration to any comments thereon received from the Investor or its counsel, or (c) the Investor shall reasonably object, unless the Company reasonably has determined that it is necessary to amend the Registration Statement or make any supplement to the Prospectus to comply with the Securities Act or any other applicable law or regulation, in which case (i) the Company shall promptly (but in no event later than twenty-four (24) hours) inform the Investor, (ii) the Investor shall be provided with a reasonable opportunity to review and comment upon any disclosure referring to the Investor, the Transaction Documents or the transactions contemplated thereby, as applicable, and (iii) the Company shall expeditiously furnish to the Investor a copy thereof. In addition, for so long as, in the reasonable opinion of counsel for the Investor, the Prospectus is required to be delivered in connection with any acquisition or sale of Securities by the Investor, the Company shall not file any Prospectus Supplement with respect to the Securities without furnishing to the Investor as many copies of such Prospectus Supplement, together with the Prospectus, as the Investor may reasonably request.

(d) Sufficient Number of Shares Registered. In the event the number of shares available under the Shelf Registration Statement at any time is insufficient to cover the Registrable Securities, the Company shall, to the extent necessary and permissible, amend the Shelf Registration Statement or file a new registration statement (together with any prospectuses or prospectus supplements thereunder, a "New Registration Statement"), so as to cover all of such Registrable Securities as soon as reasonably practicable, but in any event not later than ten (10) Business Days after the necessity therefor arises. The Company shall use its reasonable best efforts to have such amendment and/or New Registration Statement become effective as soon as reasonably practicable following the filing thereof.

(e) Offering. If the SEC seeks to characterize any offering pursuant to a Registration Statement filed pursuant to this Agreement as constituting an offering of securities that does not permit such Registration Statement to become effective and be used by the Investor under Rule 415 at then-prevailing market prices (and not fixed prices), or if after the filing of the Initial Prospectus Supplement with the SEC pursuant to Section 2(a) hereof, the Company is otherwise required by the Staff or the SEC to reduce the number of Registrable Securities included in such initial Registration Statement, then the Company shall reduce the number of Registrable Securities to be included in such initial Registration Statement (with the prior consent, which shall not be unreasonably withheld, of the Investor and its legal counsel as to the specific Registrable Securities to be removed therefrom) until such time as the SEC shall so permit such Registration Statement to become effective and be used as aforesaid. In the event of any reduction in Registrable Securities pursuant to this paragraph, the Company shall file one or more New Registration Statements in accordance with Section 2(d) hereof until such time as all Registrable Securities have been included in Registration Statements that have been declared effective and the prospectuses contained therein is available for use by the Investor.

3. RELATED OBLIGATIONS.

With respect to the Registration Statement and whenever any Registrable Securities are to be Registered pursuant to Section 2 hereof, including on the Shelf Registration Statement or on any New Registration Statement, the Company shall use its reasonable best efforts to effect the registration of the Registrable Securities in accordance with the intended method of disposition thereof and, pursuant thereto, the Company shall have the following obligations:

(a) Notifications. The Company will notify the Investor promptly of the time when any subsequent amendment to the Shelf Registration Statement or any New Registration Statement, other than documents incorporated by reference, has been filed with the SEC and/or has become effective or where a receipt has been issued therefor or any subsequent supplement to a Prospectus has been filed and of any request by the SEC for any amendment or supplement to the Registration Statement, any New Registration Statement or any Prospectus or for additional information.

(b) Amendments. The Company will prepare and file with the SEC, promptly upon the Investor's request, any amendments or supplements to the Shelf Registration Statement, any New Registration Statement or any Prospectus, as applicable, that, in the reasonable opinion of the Investor and the Company, may be necessary or advisable in connection with any acquisition or sale of Registrable Securities by the Investor (provided, however, that the failure of the Investor to make such request shall not relieve the Company of any obligation or liability hereunder).

(c) Investor Review. The Company will not file any amendment or supplement to the Registration Statement, any New Registration Statement or any Prospectus, other than documents incorporated by reference, relating to the Investor, the Registrable Securities or the transactions contemplated hereby unless (A) the Investor shall have been advised and afforded the opportunity to review and comment thereon at least two (2) Business Days prior to filing with the SEC, (B) the Company shall have given due consideration to any comments thereon received from the Investor or its counsel, and (C) the Investor has not reasonably objected thereto (provided, however, that the failure of the Investor to make such objection shall not relieve the Company of any obligation or liability hereunder), and the Company will furnish to the Investor at the time of filing thereof a copy of any document that upon filing is deemed to be incorporated by reference into the Registration Statement or any Prospectus, except for those documents available via EDGAR.

(d) Form S-3. The Company will cause each amendment or supplement to the Prospectus, other than documents incorporated by reference, to be filed with the SEC as required pursuant to the rules of Form S-3.

(e) Copies Available. The Company will furnish to the Investor and its counsel (at the expense of the Company) copies of the Registration Statement, the Prospectus (including all documents incorporated by reference therein), any Prospectus Supplement, any New Registration Statement and all amendments and supplements to the Registration Statement, the Prospectus or any New Registration Statement that are filed with the SEC during the Registration Period (including all documents filed with or furnished to the SEC during such period that are deemed to be incorporated by reference therein), in each case as soon as reasonably practicable upon the Investor's request and in such quantities as the Investor may from time to time reasonably request and, at the Investor's request, will also furnish copies of the Prospectus to each exchange or market on which sales of the Registrable Securities may be made; provided, however, that the Company shall not be required to furnish any document (other than the Prospectus) to the Investor to the extent such document is available on EDGAR.

(f) Qualification. The Company shall take all such action, if any, as is reasonably necessary in order to obtain an exemption for or to qualify (i) the issuance of the Commitment Shares and the sale of the Purchase Shares to the Investor under this Agreement and (ii) any subsequent resale of all Commitment Shares and all Purchase Shares by the Investor, in each case, under applicable securities or "Blue Sky" laws of the states of the United States in such states as is reasonably requested by the Investor during the Registration Period, and shall provide evidence of any such action so taken to the Investor. During the Registration Period, the Company shall promptly notify the Investor of the receipt by the Company of any notification with respect to the suspension of the registration or qualification of any of the Registrable Securities for sale under the securities or "blue sky" laws of any jurisdiction in the United States or its receipt of actual notice of the initiation or threat of any proceeding for such purpose.

(g) Notification of Stop Orders; Material Changes. The Company shall advise the Investor promptly (but in no event later than twenty-four (24) hours) and shall confirm such advice in writing, in each case: (i) of the Company's receipt of notice of any request by the SEC or any other federal or state governmental authority for amendment of or a supplement to the Registration Statement or any Prospectus or for any additional information; (ii) of the Company's receipt of notice of the issuance by the SEC or any other federal or state governmental authority of any stop order suspending the effectiveness of the Registration Statement or prohibiting or suspending the use of the Prospectus or Prospectus Supplement, or any New Registration Statement, or of the Company's receipt of any notification of the suspension of qualification of the Registrable Securities for offering or sale in any jurisdiction or the initiation or contemplated initiation of any proceeding for such purpose; and (iii) of the Company becoming aware of the happening of any event, which makes any statement of a material fact made in the Registration Statement or any Prospectus untrue or which requires the making of any additions to or changes to the statements then made in the Registration Statement or any Prospectus in order to state a material fact required by the Securities Act to be stated therein or necessary in order to make the statements then made therein (in the case of any Prospectus, in light of the circumstances under which they were made) not misleading, or of the necessity to amend the Registration Statement or any Prospectus to comply with the Securities Act or any other law. If at any time the SEC, or any other federal or state governmental authority shall issue any stop order suspending the effectiveness of the Registration Statement or prohibiting or suspending the use of the Prospectus or Prospectus Supplement, the Company shall use its reasonable best efforts to obtain the withdrawal of such order at the earliest practicable time. The Company shall furnish to the Investor, without charge, a copy of any correspondence from the SEC or the staff of the SEC, or any other federal or state governmental authority to the Company or its representatives relating to the Shelf Registration Statement, any New Registration Statement or any Prospectus, or Prospectus Supplement as the case may be. The Company shall not deliver to the Investor any Regular Purchase Notice, Accelerated Purchase Notice or Additional Accelerated Purchase Notice, and the Investor shall not be obligated to purchase any shares of Common Stock under the Purchase Agreement, during the continuation or pendency of any of the foregoing events. If at any time the SEC shall issue any stop order suspending the effectiveness of the Registration Statement or prohibiting or suspending the use of the Prospectus or any Prospectus Supplement, the Company shall use its reasonable best efforts to obtain the withdrawal of such order at the earliest practicable time. The Company shall furnish to the Investor, without charge, a copy of any correspondence from the SEC or the staff of the SEC to the Company or its representatives relating to the Registration Statement or the Prospectus, as the case may be.

(h) Listing on the Principal Market. The Company shall promptly secure the listing, or conditional listing as applicable, of all of the Purchase Shares and Commitment Shares to be issued to the Investor hereunder on the Principal Market (subject to standard listing conditions, if any, for transactions of this nature, official notice of issuance and the Exchange Cap) and upon each other national securities exchange or automated quotation system, if any, upon which the Common Stock are then listed, and shall maintain, so long as any Common Stock shall be so listed, such listing of all such Registrable Securities from time to time issuable hereunder. The Company shall use its reasonable best efforts to maintain the listing of the Common Stock on the Principal Market and shall comply in all respects with the Company's reporting, filing and other obligations under the bylaws or rules and regulations of the Principal Market. The Company shall not take any action that would reasonably be expected to result in the delisting or suspension of the Common Stock on the Principal Market. The Company shall promptly, and in no event later than the following Business Day, provide to the Investor copies of any notices it receives from any Person regarding the continued eligibility of the Common Stock for listing on the Principal Market; provided, however, that the Company shall not provide the Investor copies of any such notice that the Company reasonably believes constitutes material non-public information and that the Company would not be required to publicly disclose such notice in any report or statement filed with the SEC under the Exchange Act (including on Form 8-K) or the Securities Act. The Company shall pay all fees and expenses in connection with satisfying its obligations under this Section 3(h).

(i) Delivery of Shares. The Company shall cooperate with the Investor to facilitate the timely preparation and delivery of DWAC Shares (not bearing any restrictive legend) representing the Registrable Securities to be offered pursuant to the Shelf Registration Statement or any New Registration Statement and enable such DWAC Shares to be in such denominations or amounts as the Investor may reasonably request and registered in such names as the Investor may request.

(j) Transfer Agent. The Company shall at all times maintain the services of the Transfer Agent with respect to its Common Stock.

(k) Approvals. The Company shall use its reasonable best efforts to cause the Registrable Securities covered by any Registration Statement to be Registered with or approved by such other governmental agencies or authorities in the United States as may be necessary to consummate the disposition of such Registrable Securities.

(l) Confirmation of Effectiveness. If reasonably requested by the Investor at any time, the Company shall deliver to the Investor a written confirmation from Company's counsel of whether or not the effectiveness of such Registration Statement has lapsed at any time for any reason (including, without limitation, the issuance of a stop order) and whether or not the Registration Statement is currently effective and available to the Company for sale of all of the Registrable Securities.

(m) Further Assurances. The Company agrees to take all other reasonable actions as necessary and reasonably requested by the Investor to expedite and facilitate disposition by the Investor of Registrable Securities pursuant to any Registration Statement.

(n) Suspension of Sales. The Investor agrees that, upon receipt of any notice from the Company of the existence of any suspension or stop order as set forth in Section 3(f) or 3(g) hereof, the Investor will immediately discontinue disposition of Registrable Securities pursuant to any Registration Statement covering such Registrable Securities until the Investor's receipt of the copies of a notice regarding the resolution or withdrawal of the suspension or stop order as contemplated by Section 3(f) or 3(g) hereof. Notwithstanding anything to the contrary, the Company shall cause its transfer agent to promptly deliver to the Investor DWAC Shares without any restrictive legend in accordance with the terms of the Purchase Agreement in connection with any sale of Registrable Securities with respect to which the Investor has entered into a contract for sale prior to the Investor's receipt of a notice from the Company of the happening of any event of the kind described in Section 3(f) or 3(g) hereof and for which the Investor has not yet settled.

(o) Transfer Agent Instructions. On or before the date the Initial Prospectus Supplement is filed with the SEC, the Company shall issue to the Transfer Agent the Commencement Irrevocable Transfer Agent Instructions in the form agreed to prior to the date hereof, and on the date that the Initial Prospectus Supplement is filed with the SEC, the Company shall deliver, and shall cause legal counsel for the Company to deliver, to the Transfer Agent for such Registrable Securities (with copies to the Investor) confirmation that such Registration Statement has been declared effective by the SEC in the form attached as an exhibit to the Commencement Irrevocable Transfer Agent Instructions. Thereafter, if requested by the Investor at any time, the Company shall require its legal counsel to deliver to the Investor a written confirmation whether or not the effectiveness of such Registration Statement has lapsed at any time for any reason (including, without limitation, the issuance of a stop order) and whether or not the Registration Statement is current and available to the Investor for sale of all of the Registrable Securities.

4. OBLIGATIONS OF THE INVESTOR.

(a) Investor Information. The Investor has furnished to the Company in Exhibit A hereto such information regarding itself, the Registrable Securities held by it, and the intended method of disposition thereof, including any arrangement between the Investor and any other Person relating to the sale or distribution of the Securities, as required to effect the registration of such Registrable Securities and shall execute such documents in connection with such registration as the Company may reasonably request. The Company shall notify the Investor in writing of any other information the Company reasonably requires from the Investor in connection with any Registration Statement hereunder. The Investor will as promptly as practicable notify the Company of any material change in the information set forth in Exhibit A, other than changes in its ownership of Common Stock.

(b) Investor Cooperation. The Investor agrees to cooperate with the Company as reasonably requested by the Company in connection with the preparation and filing of any amendments and supplements to any Registration Statement or New Registration Statement hereunder.

5. EXPENSES OF REGISTRATION.

All reasonable expenses of the Company, other than sales or brokerage commissions and fees and disbursements of counsel for, and other expenses of, the Investor, incurred in connection with registrations, filings or qualifications pursuant to Sections 2 and 3 hereof, including, without limitation, all registration, listing and qualifications fees, printers and accounting fees, and fees and disbursements of counsel for the Company, shall be paid by the Company.

6. INDEMNIFICATION.

(a) To the fullest extent permitted by law, the Company will, and hereby does, indemnify, hold harmless and defend the Investor, each Person, if any, who controls the Investor, the members, the directors, officers, partners, employees, members, managers, agents, representatives of the Investor and each Person, if any, who controls the Investor within the meaning of the Securities Act or the Exchange Act (each, an "Indemnified Person"), against any losses, claims, damages, liabilities, judgments, fines, penalties, charges, costs, reasonable, documented, out-of-pocket attorneys' fees, amounts paid in settlement (with the prior consent of the Company, such consent not to be unreasonably withheld) or other reasonable, documented, out-of-pocket expenses, (collectively, "Claims") reasonably incurred in investigating, preparing or defending any action, claim, suit, inquiry, proceeding, investigation or appeal taken from the foregoing by or before any court or governmental, administrative or other regulatory agency or body or the SEC, whether pending or threatened, whether or not an indemnified party is or may be a party thereto ("Indemnified Damages"), to which any of them may become subject insofar as such Claims (or actions or proceedings, whether commenced or threatened, in respect thereof) arise out of or are based upon: (i) any untrue statement or alleged untrue statement of a material fact in the Shelf Registration Statement, any New Registration Statement or any post-effective amendment thereto or in any filing made in connection with the qualification of the offering under the securities or other "blue sky" laws of any jurisdiction in which Registrable Securities are offered ("Blue Sky Filing"), or the omission or alleged omission to state a material fact required to be stated therein or necessary to make the statements therein not misleading, (ii) any untrue statement or alleged untrue statement of a material fact contained in the final Prospectus or the omission or alleged omission to state therein any material fact necessary to make the statements made therein, in light of the circumstances under which the statements therein were made, not misleading, (iii) any violation or alleged violation by the Company of the Securities Act, the Exchange Act, any other law, including, without limitation, any state securities law, or any rule or regulation thereunder relating to the offer or sale of the Registrable Securities pursuant to the Shelf Registration Statement or any New Registration Statement or (iv) any material violation by the Company of this Agreement (the matters in the foregoing clauses (i) through (iv) being, collectively, "Violations"). The Company shall reimburse each Indemnified Person promptly as such expenses are incurred and are due and payable, for any reasonable, documented, out-of-pocket legal fees or other reasonable expenses incurred by them in connection with investigating or defending any such Claim. Notwithstanding anything to the contrary contained herein, the indemnification agreement contained in this Section 6(a): (A) shall not apply to a Claim by an Indemnified Person arising out of or based upon a Violation which occurs in reliance upon and in conformity with information furnished in writing to the Company by the Investor or such Indemnified Person expressly for use in connection with the preparation of the Registration Statement, any New Registration Statement, the Prospectus or any such amendment thereof or supplement thereto, if in each such case the foregoing was timely made available by the Company; (B) with respect to any superseded prospectus, shall not inure to the benefit of any such Person from whom the Person asserting any such Claim purchased the Registrable Securities that are the subject thereof (or to the benefit of any other Indemnified Person) if the untrue statement or omission of material fact contained in the superseded prospectus was corrected in the revised prospectus, as then amended or supplemented, if such revised prospectus was timely made available by the Company pursuant to Section 3(c) or Section 3(e) hereof, and the Indemnified Person was promptly advised in writing not to use the incorrect prospectus prior to the use giving rise to a Violation; and (C) shall not apply to amounts paid in settlement of any Claim if such settlement is effected without the prior written consent of the Company, which consent shall not be unreasonably withheld. Such indemnity shall remain in full force and effect regardless of any investigation made by or on behalf of the Indemnified Person and shall survive the transfer of the Registrable Securities by the Investor pursuant to Section 8 hereof.

(b) In connection with the Shelf Registration Statement, any New Registration Statement or Prospectus, the Investor agrees to indemnify, hold harmless and defend, to the same extent and in the same manner as is set forth in Section 6(a) hereof, the Company, each of its directors, each of its officers who signed the Shelf Registration Statement or signs any New Registration Statement, each Person, if any, who controls the Company within the meaning of the Securities Act or the Exchange Act (collectively and together with an Indemnified Person, an "Indemnified Party"), against any Claim or Indemnified Damages to which any of them may become subject, under the Securities Act, the Exchange Act or otherwise, insofar as such Claim or Indemnified Damages arise out of or are based upon any Violation, in each case to the extent, and only to the extent, that such Violation occurs in reliance upon and in conformity with written information about the Investor set forth on Exhibit A attached hereto or updated from time to time in writing by the Investor and furnished to the Company by the Investor expressly for inclusion in the Shelf Registration Statement or Prospectus or any New Registration Statement or from the failure of the Investor to provide notice or to deliver or to cause to be delivered the prospectus made available by the Company, if such prospectus was timely made available by the Company pursuant to Section 3(c) or Section 3(e) hereof; and, subject to Section 6(d) hereof, the Investor will reimburse any reasonable, documented, out-of-pocket legal or other expenses reasonably incurred by them in connection with investigating or defending any such Claim; provided, however, that the indemnity agreement contained in this Section 6(b) and the agreement with respect to contribution contained in Section 7 hereof shall not apply to amounts paid in settlement of any Claim if such settlement is effected without the prior written consent of the Investor, which consent shall not be unreasonably withheld; provided, further, however, that the Investor shall be liable under this Section 6(b) for only that amount of a Claim or Indemnified Damages as does not exceed the net proceeds to the Investor as a result of the sale of Registrable Securities pursuant to such Registration Statement. Such indemnity shall remain in full force and effect regardless of any investigation made by or on behalf of such Indemnified Party and shall survive the transfer of the Registrable Securities by the Investor pursuant to Section 8 hereof.

(c) Promptly after receipt by an Indemnified Person or Indemnified Party under this Section 6 of notice of the commencement of any action or proceeding (including any governmental action or proceeding) involving a Claim, such Indemnified Person or Indemnified Party shall, if a Claim in respect thereof is to be made against any indemnifying party under this Section 6, deliver to the indemnifying party a written notice of the commencement thereof, and the indemnifying party shall have the right to participate in, and, to the extent the indemnifying party so desires, jointly with any other indemnifying party similarly notified, to assume control of the defense thereof with counsel mutually satisfactory to the indemnifying party and the Indemnified Person or the Indemnified Party, as the case may be; provided, however, that an Indemnified Person or Indemnified Party shall have the right to retain its own counsel with the reasonable, documented and out-of-pocket fees and expenses to be paid by the indemnifying party, if, in the reasonable opinion of counsel retained by the indemnifying party, the representation by such counsel of the Indemnified Person or Indemnified Party and the indemnifying party would be inappropriate due to actual or potential differing interests between such Indemnified Person or Indemnified Party and any other party represented by such counsel in such proceeding. The Indemnified Party or Indemnified Person shall cooperate with the indemnifying party in connection with any negotiation or defense of any such action or claim by the indemnifying party and shall furnish to the indemnifying party all information reasonably available to the Indemnified Party or Indemnified Person which relates to such action or claim. The indemnifying party shall keep the Indemnified Party or Indemnified Person fully apprised as to the status of the defense or any settlement negotiations with respect thereto. No indemnifying party shall be liable for any settlement of any action, claim or proceeding effected without its written consent, provided, however, that the indemnifying party shall not unreasonably withhold, delay or condition its consent. No indemnifying party shall, without the consent of the Indemnified Party or Indemnified Person, consent to entry of any judgment or enter into any settlement or other compromise which does not include as an unconditional term thereof the giving by the claimant or plaintiff to such Indemnified Party or Indemnified Person of a release from all liability in respect to such claim or litigation. Following indemnification as provided for hereunder, the indemnifying party shall be subrogated to all rights of the Indemnified Party or Indemnified Person with respect to all third parties, firms or corporations relating to the matter for which indemnification has been made. The failure to deliver written notice to the indemnifying party within a reasonable time of the commencement of any such action shall not relieve such indemnifying party of any liability to the Indemnified Person or Indemnified Party under this Section 6, except to the extent that the indemnifying party is prejudiced in its ability to defend such action.

(d) The indemnification required by this Section 6 shall be made by periodic payments of the amount thereof during the course of the investigation or defense, as and when bills are received or Indemnified Damages are incurred. Any Person receiving a payment pursuant to this Section 6 which person is later determined to not be entitled to such payment shall return such payment to the person making it.

(e) The indemnity agreements contained herein shall be in addition to (i) any cause of action or similar right of the Indemnified Party or Indemnified Person against the indemnifying party or others, and (ii) any liabilities the indemnifying party may be subject to pursuant to the law.

7. CONTRIBUTION.

To the extent any indemnification by an indemnifying party is prohibited or limited by law, the indemnifying party agrees to make the maximum contribution with respect to any amounts for which it would otherwise be liable under Section 6 hereof to the fullest extent permitted by law; provided, however, that: (i) no seller of Registrable Securities guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any seller of Registrable Securities who was not guilty of fraudulent misrepresentation; and (ii) contribution by any seller of Registrable Securities shall be limited in amount to the net amount of proceeds received by such seller from the sale of such Registrable Securities.

8. ASSIGNMENT OF REGISTRATION RIGHTS.

The Company shall not assign this Agreement or any rights or obligations hereunder without the prior written consent of the Investor; provided, however, that any transaction, whether by merger, reorganization, restructuring, consolidation, financing or otherwise, whereby the Company remains the surviving entity immediately after such transaction shall not be deemed an assignment. The Investor may not assign its rights under this Agreement without the prior written consent of the Company, other than to an affiliate of the Investor controlled by Jonathan Cope or Josh Scheinfeld, in which case the assignee must agree in writing to be bound by the terms and conditions of this Agreement.

9. AMENDMENT OF REGISTRATION RIGHTS.

No provision of this Agreement may be amended or waived by the parties from and after the date that is one Business Day immediately preceding the initial filing of the Initial Prospectus Supplement with the SEC. Subject to the immediately preceding sentence, no provision of this Agreement may be (i) amended other than by a written instrument signed by both parties hereto or (ii) waived other than in a written instrument signed by the party against whom enforcement of such waiver is sought. Failure of any party to exercise any right or remedy under this Agreement or otherwise, or delay by a party in exercising such right or remedy, shall not operate as a waiver thereof.

10. MISCELLANEOUS.

(a) Notices. Any notices, consents or other communications required or permitted to be given under the terms of this Agreement must be in writing and will be deemed to have been delivered: (i) upon receipt, when delivered personally; (ii) upon receipt, when sent by electronic message (provided the electronic message is kept on file by the sending party); or (iii) one (1) Business Day after timely deposit with a nationally recognized overnight delivery service, in each case properly addressed to the party to receive the same. The contact information for such communications shall be:

If to the Company:

Lightwave Logic, Inc.
369 Inverness Parkway, Suite 350
Englewood, CO 80112
Telephone: (720) 340-4949
E-mail: jim@lightwavelogic.com
Attention: James S. Marcelli, Chief Financial Officer & Chief Operating Officer

With a copy to (which shall not constitute notice or service of process):

K&L Gates, LLP
200 S. Biscayne Blvd., Ste. 3900
Miami, Florida 33131
Telephone: (305) 539-3306
E-mail: clayton.parker@klgates.com
Attention: Clayton E. Parker, Esq.

If to the Investor:

Lincoln Park Capital Fund, LLC
415 N. LaSalle Dr., Suite 700B
Chicago, IL 60654
Telephone: (312) 822-9300
E-mail: jscheinfeld@lpcfunds.com/jcope@lpcfunds.com
Attention: Josh Scheinfeld/Jonathan Cope

If to the Transfer Agent:

Broadridge Corporate Issuer Solutions, Inc.
51 Mercedes Way
Edgewood, NY 11717
Telephone: (979) 218-8194
Email: autumn.tallaksen@broadridge.com

Attention: Autumn Tallaksen

or at such other address, e-mail address and/or to the attention of such other person as the recipient party has specified by written notice given to each other party at least one (1) Business Day prior to the effectiveness of such change. Written confirmation of receipt (A) given by the recipient of such notice, consent, waiver or other communication, (B) electronically generated by the sender's electronic mail containing the time, date and recipient email address or (C) provided by a nationally recognized overnight delivery service, shall be rebuttable evidence of receipt in accordance with clause (i), (ii), or (iii) above, respectively. Any party to this Agreement may give any notice or other communication hereunder using any other means (including messenger service, ordinary mail or electronic mail), but no such notice or other communication shall be deemed to have been duly given unless it actually is received by the party for whom it is intended.

(b) No Waiver. No failure or delay in the exercise of any power, right or privilege hereunder shall operate as a waiver thereof, nor shall any single or partial exercise of any such power, right or privilege preclude other or further exercise thereof or of any other right, power or privilege.

(c) Governing Law. All questions concerning the construction, validity, enforcement and interpretation of this Agreement shall be governed by the internal laws of the State of Illinois, without giving effect to any choice of law or conflict of law provision or rule (whether of the State of Illinois or any other jurisdictions) that would cause the application of the laws of any jurisdictions other than the State of Illinois. Each party hereby irrevocably submits to the exclusive jurisdiction of the state and federal courts sitting in the County of Cook, in the State of Illinois for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein, and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding, any claim that it is not personally subject to the jurisdiction of any such court, that such suit, action or proceeding is brought in an inconvenient forum or that the venue of such suit, action or proceeding is improper. Each party hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof to such party at the address for such notices to it under this Agreement and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any manner permitted by law. If any provision of this Agreement shall be invalid or unenforceable in any jurisdiction, such invalidity or unenforceability shall not affect the validity or enforceability of the remainder of this Agreement in that jurisdiction or the validity or enforceability of any provision of this Agreement in any other jurisdiction. **EACH PARTY HEREBY IRREVOCABLY WAIVES ANY RIGHT IT MAY HAVE, AND AGREES NOT TO REQUEST, A JURY TRIAL FOR THE ADJUDICATION OF ANY DISPUTE HEREUNDER OR IN CONNECTION HEREWITH OR ARISING OUT OF THIS AGREEMENT OR ANY TRANSACTION CONTEMPLATED HEREBY.**

(d) Integration. This Agreement**,** the Purchase Agreement and the other Transaction Documents constitute the entire understanding among the parties hereto with respect to the subject matter hereof and thereof. There are no restrictions, promises, warranties or undertakings, other than those set forth or referred to herein and therein. This Agreement**,** the Purchase Agreement and the other Transaction Documents supersede all other prior oral or written agreements between the Investor, the Company, their affiliates and persons acting on their behalf with respect to the subject matter hereof and thereof.

(e) No Third Party Benefits. Subject to the requirements of Section 8 hereof, this Agreement shall inure to the benefit of and be binding upon the permitted successors and assigns of each of the parties hereto.

(f) Headings. The headings in this Agreement are for convenience of reference and shall not form part of, or affect the interpretation of, this Agreement.

(g) Counterparts. This Agreement may be executed in two (2) or more identical counterparts, all of which shall be considered one and the same agreement and shall become effective when counterparts have been signed by each party and delivered to the other party; provided that a pdf (or other electronic reproduction of a) signature shall be considered due execution and shall be binding upon the signatory thereto with the same force and effect as if the signature were an original, not a pdf (or other electronic reproduction of a) signature.

(h) Further Assurances. Each party shall do and perform, or cause to be done and performed, all such further acts and things, and shall execute and deliver all such other agreements, certificates, instruments and documents as the other party may reasonably request in order to carry out the intent and accomplish the purposes of this Agreement and the consummation of the transactions contemplated hereby.

(i) Mutual Agreement. The language used in this Agreement will be deemed to be the language chosen by the parties to express their mutual intent and no rules of strict construction will be applied against any party.

(j) No Third Party Beneficiaries. This Agreement is intended for the benefit of the parties hereto and their respective permitted successors and assigns, and is not for the benefit of, nor may any provision hereof be enforced by, any other Person.

11. TERMINATION.

The obligations of the Company contained in Sections 2, 3, and 5 of this Agreement shall terminate in their entirety upon the earlier of (i) the date on which the Investor shall have sold all the Securities and no Available Amount remains under the Purchase Agreement and (ii) 180 days following the earlier of (A) the Maturity Date and (B) the date of termination of the Purchase Agreement; provided, that as long as any of the Securities remain unsold by the Investor, the Company must make available "current public information" pursuant to Rule 144 promulgated under the Securities Act until the Investor may sell the Securities without restriction (including any restrictions under Rule 144(c) or Rule 144(i)).

[Signature Page Follows]

IN WITNESS WHEREOF, the parties have caused this Registration Rights Agreement to be duly executed as of date first written above.

THE COMPANY:

LIGHTWAVE LOGIC, INC.

By: /s/ James S. Marcelli
Name: James S. Marcelli
Title: Chief Financial Officer & Chief Operating Officer

THE INVESTOR:

LINCOLN PARK CAPITAL FUND, LLC
BY: LINCOLN PARK CAPITAL, LLC
BY: ROCKLEDGE CAPITAL CORPORATION

By: /s/ Joshua Scheinfeld
Name: Joshua Scheinfeld
Title: President

EXHIBIT A

Information About The Investor Furnished To The Company By The Investor
Expressly For Use In Connection With Each Registration Statement and Prospectus

Information With Respect to Lincoln Park Capital

Immediately prior to the date of the Purchase Agreement, Lincoln Park Capital Fund, LLC, beneficially owned 52,255 shares of Common Stock. Josh Scheinfeld and Jonathan Cope, the Managing Members of Lincoln Park Capital, LLC, the manager of Lincoln Park Capital Fund, LLC, are deemed to be beneficial owners of all of the Common Stock owned by Lincoln Park Capital Fund, LLC. Messrs. Cope and Scheinfeld have shared voting and investment power over the shares being offered under the prospectus supplement filed with the SEC in connection with the transactions contemplated under the Purchase Agreement. Lincoln Park Capital, LLC is not a licensed broker dealer or an affiliate of a licensed broker dealer.

EXHIBIT 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Board of Directors of
Lightwave Logic, Inc.

We hereby consent to the incorporation by reference in the registration statements of Lightwave Logic, Inc. on:

- Form S-8 (No. 333-273055)
- Form S-8 (No. 333-234737)
- Form S-8 (No. 333-213541)
- Form S-8 (No. 333-189943)
- Form S-8 (No. 333-198916)
- Form S-3 (No. 333-281059)

of our reports dated March 18, 2025, relating to the financial statements of Lightwave Logic, Inc. as of and for the year ended December 31, 2024.

/s/ Stephano Slack LLC

Wayne, Pennsylvania
March 18, 2025

EXHIBIT 23.2

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Board of Directors of
Lightwave Logic, Inc.

We hereby consent to the incorporation by reference in the registration statements of Lightwave Logic, Inc. on:

- Form S-8 (No. 333-273055)
- Form S-8 (No. 333-234737)
- Form S-8 (No. 333-213541)
- Form S-8 (No. 333-189943)
- Form S-8 (No. 333-198916)
- Form S-3 (No. 333-281059)

of our reports dated February 29, 2024, relating to the financial statements of Lightwave Logic, Inc. and the effectiveness of internal control over financial reporting.

/s/ Morison Cogen LLP

Blue Bell, Pennsylvania
February 29, 2024

EXHIBIT 31.1

CERTIFICATION

I, Yves LeMaitre, certify that:

1. I have reviewed this Annual Report on Form 10-K of Lightwave Logic, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: March 18, 2025

/s/ Yves LeMaitre
Yves LeMaitre
Chief Executive Officer
(Principal Executive Officer)

EXHIBIT 31.2

CERTIFICATION

I, James S. Marcelli, certify that:

1. I have reviewed this Annual Report on Form 10-K of Lightwave Logic, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: March 18, 2025

/s/ James S. Marcelli

James S. Marcelli
Chief Financial Officer
(Principal Financial Officer)

EXHIBIT 32.1

CERTIFICATION PURSUANT TO
SECTION 1350, CHAPTER 63 OF TITLE 18, UNITED STATES CODE,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report on Form 10-K of Lightwave Logic, Inc. (the "Company") for the year ended December 31, 2024 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Yves LeMaitre, Chief Executive Officer of our Company, certify, pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of section 1350, Chapter 63 of Title 18, United States Code), that, to my knowledge:

1. The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

2. The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of our Company.

Date: March 18, 2025

/s/ Yves LeMaitre
Yves LeMaitre
Chief Executive Officer
(Principal Executive Officer)

The foregoing certification is being furnished solely pursuant to section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of section 1350, Chapter 63 of Title 18, United States Code) and is not being filed as part of the Report or as a separate disclosure document.

EXHIBIT 32.2

CERTIFICATION PURSUANT TO
SECTION 1350, CHAPTER 63 OF TITLE 18, UNITED STATES CODE,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report on Form 10-K of Lightwave Logic, Inc. (the "Company") for the year ended December 31, 2024 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, James S. Marcelli, Chief Financial Officer of our Company, certify, pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of section 1350, Chapter 63 of Title 18, United States Code), that, to my knowledge:

1. The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

2. The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of our Company.

Date: March 18, 2025

/s/ James S. Marcelli
James S. Marcelli
Chief Financial Officer
(Principal Financial Officer)

The foregoing certification is being furnished solely pursuant to section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of section 1350, Chapter 63 of Title 18, United States Code) and is not being filed as part of the Report or as a separate disclosure document.